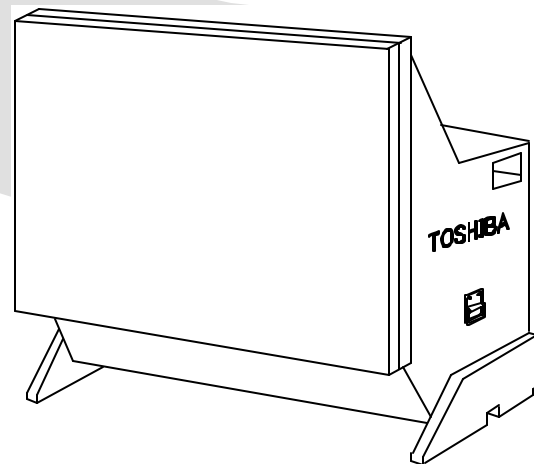


# TOSHIBA

SERVICE MANUAL

DATA WALL PROJECTION UNIT

# P503DL



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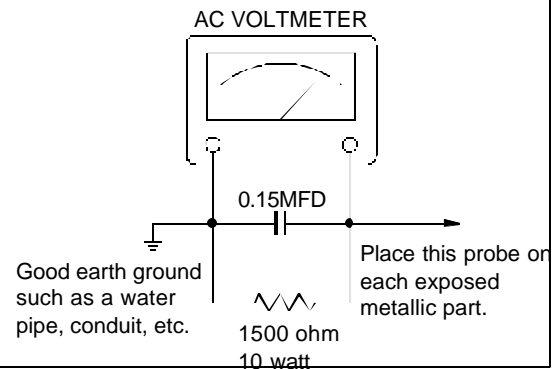
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## SAFETY PRECAUTION

**WARNING:** Service should not be attempted by anyone unfamiliar with the necessary precautions on this projector. The following are the necessary precautions to be observed before servicing this chassis.

1. An isolation Transformer should be connected in the power line between the projector and the AC line before any service is performed on the projector.
2. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as; non-metallic control knobs, insulating covers, shields, isolation resistor-capacitor network etc.
3. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as terminals, screwheads, metal overlays, control shafts etc. to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000-ohm per volt or more sensitivity in the following manner: Connect a 1500-ohm 10W resistor, paralleled by a 0.15-MFD, AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500-ohm resistor and 0.15-MFD capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 5.25V(rms). This corresponds to 3.5mA(AC). Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



## PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the international hazard symbols on the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.


## ULTRAVIOLET DANGER IN SERVICE MODE

Eye damage may result from directly viewing the light produced by the lamp used in this product. Always turn off lamp before opening this cover. Ultraviolet radiation eye protection required during servicing.

## SAFETY PRECAUTIONS FOR USER

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On the product and in the operation manual, precautions are presented to use this equipment safely, in order to protect you and other persons from injury and to protect from property damage. Indications and symbols for such precautions are as shown below.

 <b>WARNING</b>	Wrong operation or incorrect handling by ignoring this notice may result in death or serious injury of users and third parties.
	Wrong operation or incorrect handling by ignoring this notice may result in serious injury of users, third parties and damage to property.

### First things to be observed

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#### When installing or move the equipment:

#### **WARNING**

Installation or transportation of this equipment shall be entrusted to vendors qualified by " Toshiba Lightning and Technology ".  
Installation and transportation by parties other than qualified dealers may result in injury or damage of the equipment. Also, improper power connection may result in fire disasters.  
For installation notes, please refer to the section entitled "Items to be confirmed with a qualified dealer before installation".

### Items to be observed upon use of this equipment

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#### For abnormality or trouble

#### **WARNING**

If during operation the unit emits smoke or odor, cut off the power circuit breaker immediately and disconnect the power plug from the outlet.

After confirming smoke has stopped, contact your dealer for repair.

If you should continue using the equipment, fire or electric shocks may result.

When no image appears on the screen, cut off the power circuit breaker immediately and disconnect the power plug from the outlet.

If you should continue using the equipment, fire or electric shocks may result. Contact your dealer for repair.

If water or a foreign matter should get into the equipment, cut off the power circuit breaker immediately and disconnect the power plug from the outlet.

If you should continue using the equipment, fire or electric shocks may result. Contact your dealer for repair.

If the equipment should fall down or the cabinet is broken, cut off the power circuit breaker immediately and disconnect the power plug from the outlet.

If you should continue using the equipment, fire or electric shocks may result. Contact your dealer for repair.

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## Equipment Use

### WARNING

Do not remove the rear cabinet cover, as there are high-voltage parts in the unit. Touching components inside may result in electric shocks.

End user should not repair or reconstruct the equipment.

Never attempt to do so, otherwise fire disaster or electric shocks may result. For repair, contact your dealer.

Do not damage, break, modify, bend forcibly, tug, twist, bundle, place heavy weights on or heat the power cable.

If the equipment is used with damaged power cable, fire disaster or electric shocks may result.

If the cable is damaged, contact your dealer for repair.

Do not insert or drop metals, liquids or combustible materials into the equipment through the vent holes, etc. Fire disaster or electric shocks may result.

Do not place items on the equipment. These may fall from the unit, resulting in injury or other damage.

Do not obstruct any of the ventilation holes. Should metals or liquids get into the equipment, fire or electric shocks may result.

Do not humidify the atmosphere around the unit. Do not place a humidifier near or under the unit.

High humidity may cause fire or electric shocks. Also, the screen may be degraded and broken, resulting in injury.

### CAUTION

When disconnecting the power plug, do not pull the power cable.

Make sure to hold the plug to disconnect. If you pull the cable, the cable may be damaged, causing fire or electric shocks.

Do not connect/disconnect the power plug with wet hands. It may cause electric shocks.

Do not step on the equipment, or place heavy items on it.

This may cause the unit to fall possibly causing injury or damage, which may also cause fire or electric shocks.

When leaving the equipment out of use for a long time, make sure to disconnect the power plug from the outlet for safety.

When the power supply is turned off by the controller and the equipment is placed in "stand-by" mode, electricity is still consumed and parts of the circuitry are still "live".

If the equipment is not to be used for extended periods, shut off the power by main power switch and isolate from the main power supply to avoid any unexpected problems, which may cause fire or other damage.

Do not block the vent ports of the equipment, or obstruct airflow around the equipment.

When the vent ports are blocked, temperature inside will rise and cause fire disaster. For example, avoid using the equipment under the following conditions.

- (1) Cover the equipment with a cloth or curtain.
- (2) Place packages around the equipment or stand things against the equipment.
- (3) Operating the equipment in an enclosed cabinet, without adequate ventilation.
- (4) Operating the equipment in a manner or environment outside the published specifications.

Do not expose the equipment to oily smoke or steam, or use the equipment in dusty atmosphere.

Do not expose the equipment to wind and rain. This may cause damage to the unit, which can result in electric shocks or other injury.

The screen may drop or fall down due to wind, excessive vibration etc. and cause injury or damage.

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**For servicing, maintenance and inspection****⚠ WARNING**

If dust or dirt is visible on the blades or the blade clamping face of the power plug, clean the plug or blade clamping face before connection. Otherwise, fire may occur due to lowering of insulation of the power plug.

**⚠ CAUTION**

Make a maintenance contract with the dealer and entrust the dealer with periodical inspection and adjustment.

If the equipment is left for long time without cleaning, dust inside the equipment may build up and the unit may malfunction, possibly causing fire, electric shocks or other third party damage.

Servicing of the equipment must only be performed after disconnecting the power plug from the outlet.

Otherwise electric shocks resulting in death or injury may occur.

Pay attention to all connection cables. Injury may occur by being caught by or stumbling on the cables.

In addition, the equipment may fall down, resulting in injury or damage.

**Items to be confirmed with the qualified dealer before installation****⚠ WARNING**

This equipment has been designed exclusively for indoor use. Do not use the equipment outdoors; fire or electric shocks may result.

Do not install the equipment on or in unstable locations. The equipment may drop or fall down, resulting in injury.

When mounting the equipment on a wall or other vertical surface, ensure that all fixings are secure and that the surface the equipment is being fastened to, is perpendicular and capable of supporting the additional load.

When mounting the equipment from a ceiling or other overhead horizontal surface, ensure that all fixings are secure and able to support the load. Also ensure that the horizontal surface can support the additional load and that any fixings used do not cause a trip or other safety hazard.

Confirm that the installation procedure are undertaken with sufficient allowance and consideration for the total weight/load of all the units installed in the event of outside influences such as earthquakes, explosions or other factors.

Always ensure that installation does not cause or create a safety hazard by being placed too low, so that a passer-by can hit the unit with their head or other body part by accident.

If the installation is unstable, the equipment may drop or fall down, resulting in injury.

Do not install the equipment at places exposed to direct sunshine, or where temperature rises, such as a place near heater, etc.

If the temperature inside the equipment rises, fire may result.

Do not use the equipment in places with high humidity, such as a bathroom or a place near a humidifier.

It may cause fire or electric shocks. Also, the screen may become broken, resulting in injury.

Do not use the equipment with power voltages other than the one indicated on the equipment. otherwise, fire or electric shocks may result.

Make sure to install a circuit breaker in the power supply line exclusively for the equipment.

otherwise, fire may occur because the power supply cannot be cut off immediately when trouble or abnormality occurs in the equipment.

The socket-outlet shall be installed near the equipment and shall be easily accessible.

Make sure to provide ground line from the ground terminal of the power plug. Otherwise, electric shocks may result.

Always calculate the total loading of any installed equipment and ensure that the power supply, (sockets or other outlets) are suitable for the installation. Failure to do so may cause fire or electric shocks due to overload.

Do not place or store anything on the equipment. If metals, liquid or other objects should get inside the equipment, fire or electric shocks may result. Also, any heavy items placed on the top of the units may fall down, resulting in injury or damage.

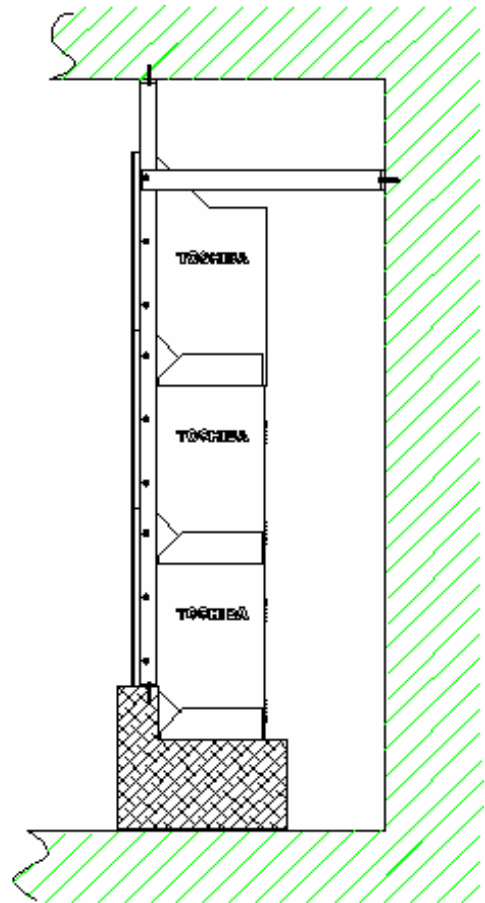
Secure the equipment to the building. The wall to be attached needs to have strong and rigid construction. A high position projection system may topple during an earthquake. Human life and property may sustain great damage if a system topples. Prevent toppling and accidents. Following offers some examples of how to avoid toppling. Use the most appropriate one for the installation conditions.

## ⚠ CAUTION

Do not block the vent ports of the equipment, or obstruct airflow around the equipment.

When the vent ports are blocked, temperature inside cube will rise and cause fire disaster. For example, do not use the equipment in the following conditions.

- (1) Install the equipment in places with poor ventilation.
- (2) Place the equipment facing up, sideways, or upside-down.
- (3) Place the equipment on a carpet or bedding.
- (4) Cover the equipment with a cloth or curtain.
- (5) Place packages around the equipment or lean/place items against the equipment.
- (6) Placing the equipment on a table, unstable base or directly against a wall. Rear access is required for periodic maintenance or inspection.
- (7) Do not place the equipment where it may be exposed to dust, oily smoke or steam such as a cooking area, etc..
- (8) Do not place the equipment where it may be exposed to wind and rain.  
The screen may drop or fall down due to wind and cause injury. Or rain may result in fire or electric shocks.



## PRECAUTIONS FOR USE AND MAINTENANCE

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### Request to User

#### Plastic Screen

The P503DL screen is made of a plastic material and can be easily scratched. During manufacture and packing, every care is taken to ensure that no hard objects that could scratch or otherwise cause damage are allowed to touch the screen when opening the carton box and taking out the product. Please exercise caution, when unpacking the unit to prevent the packing material or other items from scratching and rubbing the screen to avoid (i) damage to the screen and (ii) generation of static electricity which may attract dust particles onto the screen.

### Precautions on Use

#### Connection of a grounded cable

Ground the projection unit in order to prevent electric shock with 3-core power cable. There is greater danger of electric shock when multi projection units are used without ground wire connected.

#### Condensation

When room temperature rises rapidly (or the Data Display projection unit is moved from a cold place to a hot place), condensation may form on the lens, causing picture distortion or color fade-out. In such case, wait for a while (with keeping power ON) until the condensation clears.

#### About cooling fan and color wheel motor

The axial cooling fan and also color wheel motor in the projection unit should be considered a consumable item and need to be replaced after about one or two years of use or whenever noise or other symptoms of breakdown are apparent. Contact your dealer for the replacement work.

\*\* Air filter equipped at air intake needs periodical cleaning. A clogged air filter will result in temperature build up inside the P503DL cabinet. Possibly in excess of stated operating specification, this may lead to malfunction or reduced equipment life.

### Maintenance

Do not use solvent or paint thinner

If these are used, coating layer may peel off or deteriorate. If rubber or plastic comes into contact with the projection unit for a long time, the projection unit may be stained.

#### Care of the screen

After switching the power supply off, gently wipe the screen with a soft cotton cloth. Since the screen surface is easily scratched, this may also build up an electronic static charge. Do not rub it with a hard object; the screen may be easily damaged. Never use a chemical duster.

#### Care of the cabinet

After switching the power supply off, wipe gently with soft cloth.

When using a chemical duster, follow the maker's precautions.

#### Care of the air filter

The air intake filter should be regarded as a consumable and changed on periodic bases, depending on the operating conditions. If or when the filter becomes clogged (by oily smoke etc) replacement of the filter is recommended.

For a temporarily remedy, the filter may be cleaned by an oil removal cleaner, detergent used in a kitchen or a diluted vinegar solution.



## GENERAL DESCRIPTIONS

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### FEATURES

- Digital Light Processing™ (DLP™) by Texas Instruments

P503DL is a projection unit using the Texas Instruments' Digital Mirror Device (DMD)™ optical element. The DLP™, Digital Light Processing™ engine is constructed with the DMD chip, with XGA resolution.

- Input capability

From PC video output card, SVGA signal is best suitable but some others are also compatible. Incoming PC signal timing should be followed the VESA standard.

SVGA signal is reproduced on screen without having any scaling function.

The other frequencies are converted to XGA resolution inside the cube. See note 1.

In case of SXGA resolution such as 1280x1024, an original aspect ration of 5:4 is changed to DLP aspect ratio of 4:3 so that picture may have different shape in this resolution.

- Internal magnification  
A multi-screen system can be formed easily with an internal magnification up to x6 magnification.

- Superior image quality
  - \* Native resolution of XGA, 1024 x 768 pixels
  - \* No burn-in unlike projection tube
  - \* High Contrast image by 12-degree mirror flip Double Data Rate DMD chip

- Easy installation and maintenance
  - \* Convergence free between colors
  - \* Steady geometric alignment
  - \* Engine installed at factory

- Easy replacement 10,000/6000 H (Survival rate of 50%) UHP 100/120W selectable lamp power, See note 2

- Low power consumption  
100W UHP lamp is used for light source, ballast power selection of 100W/120W is possible. Total power consumption is less than 200W.

- Highly reliable control system

Projection system can be controlled with a PC via RS232C cable. Also most of the control/adjustment is possible to do with optional wired remote control, CF90000. RS232C IN/OUT are equipped to send command and also for communication between cubes.

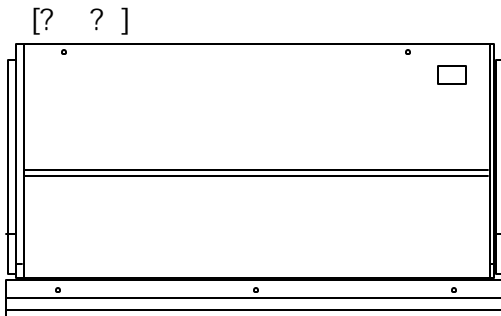
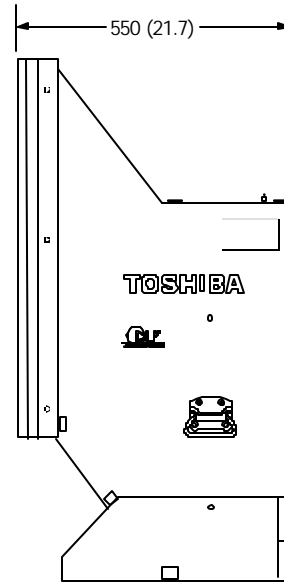
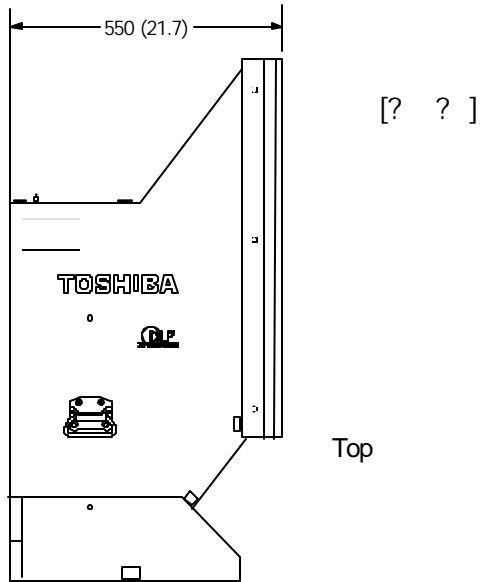
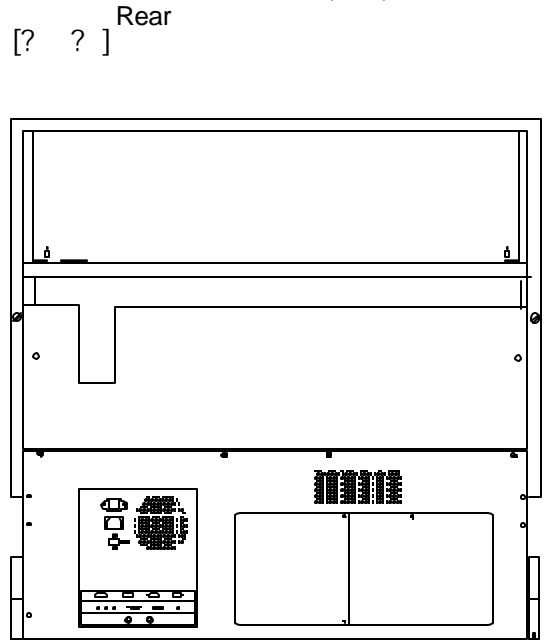
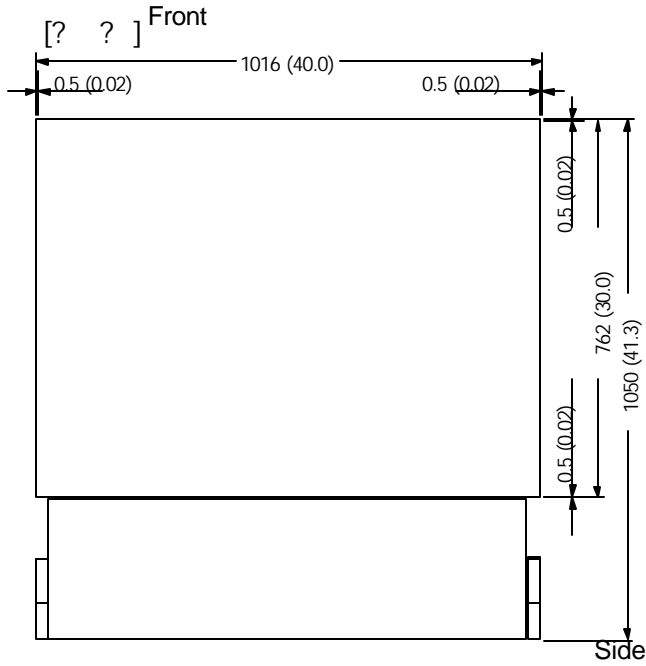
- Mechanical function  
Screen escutcheon can be removed from front. The mullion size is 1.0mm. When adjacent cube is attached, total mullion size becomes 2.5mm including gap in between.

Note 1: This does not mean that all the signals are accepted. For acceptable signals, refer to the later page in Acceptable Signal Type and also Acceptable RGB input Signal Timing.

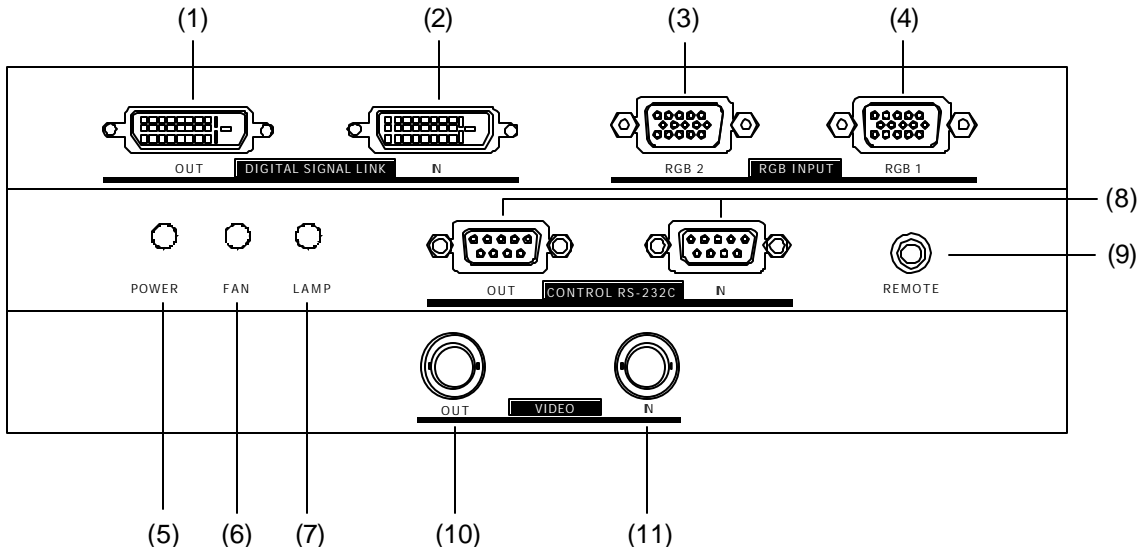
Note 2: The lamp is expected to last more than 8000H, with the recent information, it will be more than 10000H, with survival rate of 50% at 100W power selection, however, the actual life of each lamp varies depending on conditions of use. For warranty and exchange of lamp, please check with your dealer/distributor.

# P503DL DIMENSIONS

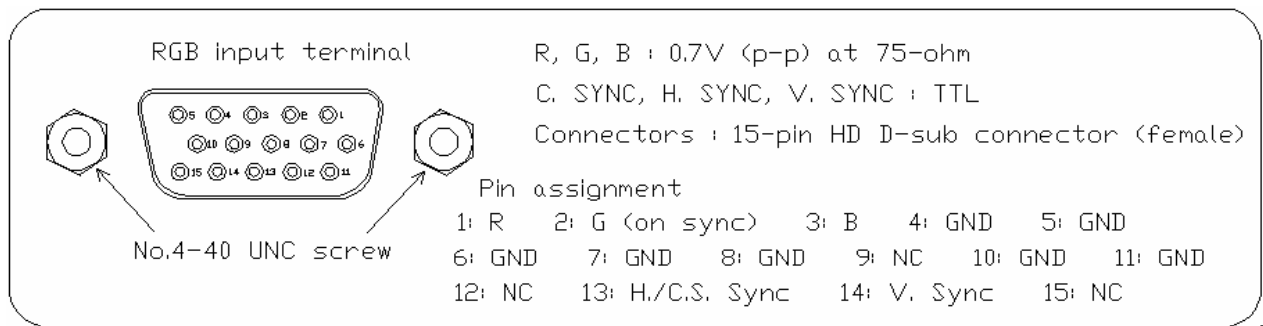
Size: mm (inch)



## FUNCTION OF I/O PANEL



No.	Name	Function	Remarks
1	DVI Digital Output	DVI Link (switched) Output	Digital pins of DVI connector
2	DVI Digital Input	DVI Input (Link or PC)	Digital pins of DVI connector
3	RGB-2 Input terminal	RGB-HV signal Input	D-sub HD 15-pin (female)
4	RGB-1 Input terminal	RGB-HV signal	D-sub HD 15-pin (female)
5	Power Indicator	Power status indication	Green/Red two colors LED
6	Fan Indicator	Fan status indication	Green LED
7	Lamp Indicator	Fan status indication	Green LED
8	RS232C Output	RS232C Communication	D-sub 9-pin (male)
8	RS232C Input	RS232C Communication	D-sub 9-pin (female)
9	Remote control Input jack	Wired remote control	3.5mm stereo Mini Jack
10	Video Output	Composite Video thru-Output	BNC connector
11	Video Input	Composite Video Input	BNC connector



**Note: Video signal: not fully compatible**

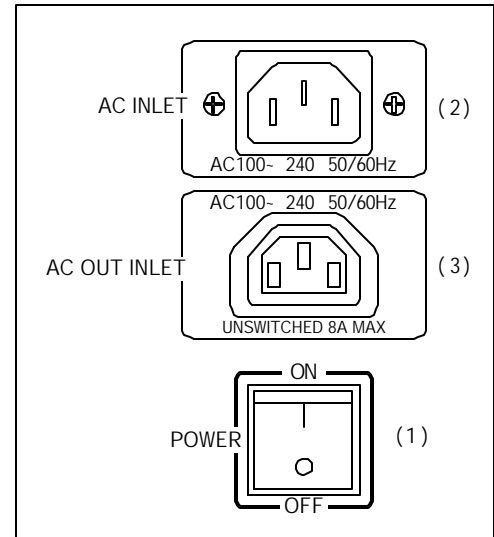
Basic model does not include Video input terminal since the moving picture displayed with this unit may not have full compatibility and picture will not display all the pictures supplied, it may appear as missing field, picture lacks smooth movement

## FUNCTION OF POWER PANEL

Note 1: The AC outlet supplies un-switched power source to a second unit in a multi-projection system.  
Do not use it for any other purpose. Serial connection using this power outlet must be maximum of four units including the 1st unit.

Note 2: The plug type of the projection unit power cable may not match the AC outlet. When power is to be supplied to another unit from this AC outlet, please purchase necessary power cable.

Note 3: About Power Supply cord  
The Power Supply cord must be in accordance with the applicable standards.  
A three-core cord, one for ground, must be used.  
The power cord must be at least 1.0mm<sup>2</sup> and H05VV-F.



No.	Name	Function	Remarks
1	Power Switch	Turn ON and OFF main power	ON/OFF
2	AC Inlet	AC 100-240V, 50/60Hz input	3P plug
3	AC Outlet	AC outlet, un-switched, max 8A	3P socket

## POWER SWITCH AND POWER INDICATOR

AC power source is turned-on/off with the Power Switch. When the Power Switch is turned-on, the Power Lamp LED Indicator lights in green, Fan indicator by green and some periods later, green at Lamp when lamp is ON and the projection unit enters active state.

It takes about 30 seconds typically till an image is shown after Power Switch is turned-on.

In the active state, it is possible to power on/off with an external controller. When power is turned-off with an external controller, the Power Indicator LED lights in red color and a projection unit enters standby state.

Interval from turn-off to turn-on shall be more than 30 seconds. If the interval is not enough, the lamp may not strike, longer the wait time, lamp life risk becomes less. If the user continues to repeat this short wait re-strike, it may shorten the life of the lamp.

The power/lamp/fan indicators also indicate failure information of the projection unit by blinking light. The later page at appendix list shows the lamp status.

## SPECIFICATIONS

Model name	P503DL
Type	50-inch rear projection unit
Acceptable signals	Refer to page 13 and page 14.
Image device	1 chip XGA Digital Mirror Device <sup>(R)</sup> Double Data Rate type
Light source	100W/120W switch selectable UHP lamp
Resolution	1024 x 768 dots (Include part hidden with screen frame)
Brightness	500cd/m <sup>2</sup> (Typ.) by 120W operation
Screen	Fresnel sheet (internal), Lenticular sheet (external)
Screen frame	1 mm average (2.5mm between cubes when two are attached)
Viewing Angle	Horizontal: Min. 150 degrees, Vertical: Min. 60 degrees
Operating temperature	5-35 ° (41-95 F)
Operating humidity	30-70 % (Relative humidity non-condensing)
Power requirement	AC100-240V, 50/60Hz, 200W (200VA)
Dimensions	1016 (W) x 1050 (H) x 550 (D) mm (40.0 x 41.3 x 21.7 inch)
Weight	about 63kg (139 lbs)
Accessories	Owner's Manual, Assembly screws

Video Input	Terminal	Video Composite Input: BNC
	Level	Video Input: 1.0Vp-p composite video, PAL/NTSC
DVI Input		DVI signal from PC or Link, No HDCP compatible
RGB Inputs	Terminal	RGB input: HD D-sub 15pin (female) connector
	Level	R/G/B signal: 0.7Vp-p (75-ohm termination) H.SYNC / V.SYNC signals: TTL
External control		System: RS-232C, Terminal: D-sub 9pin (female) connector x 1 Speed: 1200, 2400, 4800, 9600 baud
Communication Link		System: RS-232C, Terminal: D-sub 9pin connector x 2 for IN and OUT
Remote Control Terminal		3.5mm terminal for optional CT-90000 Remote Controller

The DVI input is compatible for PC signal but for 1080i HDCP.

DVI connector and RS232C cables are included as accessories. RS232C cable is common type and if cubes are assembled more than 10 sets, RS232C communication error may become obvious by means of its standard, length limitation. In such case, using better and thicker wire may extend the cable length or possibly use buffered splitter and separate the wiring into two or more branch will result better communication.

DVI output signal is possible to make link for any selected input but this DVI output comes after its frequency converted digital output, having several frames of signal delay. Thus quick movement such as moving video may result signal delay added by each cubes and picture may not match while moving image displayed.

The specifications and design of this product are subject to change without notice.

## ACCEPTABLE SIGNAL TYPE

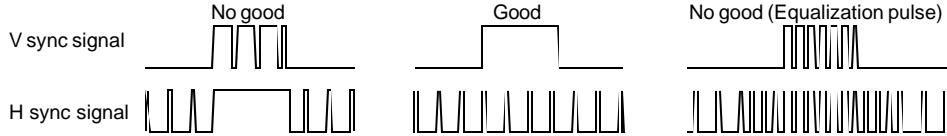
The following are acceptable input signal types. Projection unit automatically distinguishes mode according to frequency of input signal. All the signals accepted are displayed on screen with 1024x768 dot by internal resolution converter. The Digital Signal Link function may not support NTSC/PAL/SECAM signal supplied from RGB-1 and RGB-2 input terminal. Also, Digital Signal Link function may not support unstable signal either.

Format Type	Mode	H. Freq.	V. Freq.	Input Resolution	Sync Pol. HW	Scan Type	Input Terminal
NTSC 358-443 Standard	NTSC2	15.734	59.94		N/N	Interlaced	Video IN
PAL SECAM	PAL2	15.625	50.00		N/N	Interlaced	Video IN
NEC PC98 @56Hz	NEC-24k	24.820	55.90	640 x 400	N/N	Non interlaced	RGB IN
VGA Graphic 350 lines @70Hz	Text-70	31.469	70.087	640 x 350	P/N	Non interlaced	RGB IN
VGA Graphic 400 lines @70Hz	Text-70	31.467	70.087	640 x 400	N/P	Non interlaced	RGB IN
VESA 640 x 350 @85Hz	TEXT85	37.861	85.08	640 x 350	P/N	Non interlaced	RGB IN
VESA 640 x 400 @85Hz	TEXT85	37.861	85.080	640 x 400	N/P	Non interlaced	RGB IN
VESA 720 x 400 @85Hz	TEXT85	37.927	85.039	720 x 400	N/N	Non interlaced	RGB IN
VGA 640 x 480 @50Hz	VGA50	26.250	50.000	640 x 480	N/N	Non interlaced	RGB IN
VESA 640 x 480 @60Hz	VGA60	31.469	59.940	640 x 480	N/N	Non interlaced	RGB IN
VESA 640 x 480 @72Hz	VGA72	37.861	72.809	640 x 480	N/N	Non interlaced	RGB IN
VESA 640 x 480 @75Hz	VGA75	37.50	75.000	640 x 480	N/N	Non interlaced	RGB IN
VESA 640 x 480 @85Hz	VGA85	43.269	85.008	640 x 480	N/N	Non interlaced	RGB IN
Macintosh 13 Inch Mode @67Hz	MAC13	35.000	66.667	640 x 480	- / -	Non interlaced	RGB IN
SVGA 800 x 600 @50Hz	SVGA50	31.400	50.000	800 x 600	N/N	Non interlaced	RGB IN
VESA 800 x 600 @56Hz	SVGA56	35.156	56.250	800 x 600	P/P	Non interlaced	RGB IN
VESA 800 x 600 @60Hz	SVGA60	37.879	60.317	800 x 600	P/P	Non interlaced	RGB IN
VESA 800 x 600 @72Hz	SVGA72	48.077	72.188	800 x 600	P/P	Non interlaced	RGB IN
VESA 800 x 600 @75Hz	SVGA75	46.875	75.000	800 x 600	P/P	Non interlaced	RGB IN
VESA 800 x 600 @85Hz	SVGA85	53.674	85.061	800 x 600	P/P	Non interlaced	RGB IN
Macintosh 16 Inch Mode @75Hz	MAC16	49.725	74.550	832 x 624	- / -	Non interlaced	RGB IN
XGA 1024 x 768 @50Hz	XGA50	40.300	50.000	1024 x 768	N/N	Non interlaced	RGB IN
VESA 1024 x 768 @43Hz	XGA43	35.522	43.479	1024 x 768	P/P	Interlaced	RGB IN
VESA 1024 x 768 @60Hz	XGA60	48.363	60.004	1024 x 768	N/N	Non interlaced	RGB IN
VESA 1024 x 768 @70Hz	XGA70	56.476	70.069	1024 x 768	N/N	Non interlaced	RGB IN
VESA 1024 x 768 @75Hz	XGA75	60.023	75.029	1024 x 768	P/P	Non interlaced	RGB IN
VESA 1024 x 768 @85Hz	XGA85	68.677	84.997	1024 x 768	N/N	Non interlaced	RGB IN
Macintosh 19 Inch Mode @75Hz	MAC19	60.135	74.700	1024 x 768	N/N	Non interlaced	RGB IN
SXGA 1280 x 1024 @50Hz	SXGA50	53.000	50.000	1280 x 1024	N/N	Non interlaced	RGB IN
VESA 1280 x 1024 @60Hz	SXGA60	63.981	60.02	1280 x 1024	N/N	Non interlaced	RGB IN
VESA 1280 x 1024 @75Hz	SXGA75	79.976	75.025	1280 x 1024	P/P	Non interlaced	RGB IN
SEGA 640 x 480 @60Hz	SEGA60	31.678	79.770	640 x 480	N/N	Non interlaced	RGB IN
Bowling 430 x 252 @60Hz	15.78	15.780	60.692	430 x 252	N/N	Non interlaced	RGB IN
Timing C 640 x 480 @60Hz	Tri-F60	31.469	59.941	640 x 480	N/N	Non interlaced	RGB IN
480p 720 x 480 @60Hz	480p	31.542	60.080	856 x 525	N/N	Non interlaced	RGB IN
720p 1280 x 720 @60Hz	720p	45.000	60.000	1650 x 750	N/N	Non interlaced	RGB IN
EDTV 720 x 480 @60Hz	EDTV	31.469	59.941	858 x 525	N/N	Non interlaced	RGB IN

Note 1: In composite sync or sync - on-green signal, H sync signal must be inserted into V sync signal.



Note 2: In H/V separation sync signal, V sync signal must not be included H sync signal or equalization pulse. Also, H sync signal must not included V sync signal and equalization pulse.

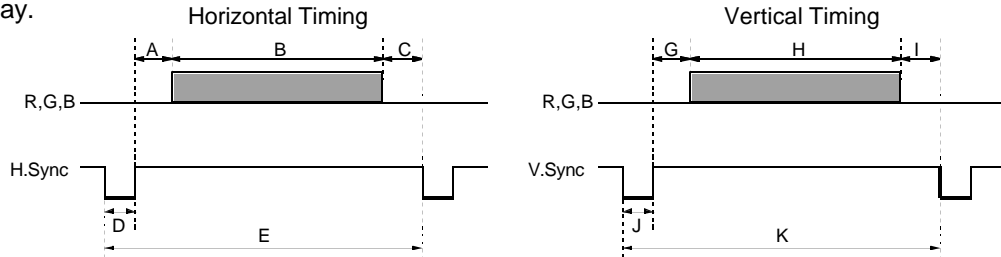


Note 3: When composite sync or sync-on-green signal is supplied, horizontal frequency must be 31 kHz or higher.

Note 4: Sync signal : Horizontal Positive or Negative. Minimum H. sync width : 1μS  
Vertical Positive or Negative. Minimum V. sync width : 2H

## ACCEPTABLE RGB INPUT SIGNAL TIMING

Following are acceptable RGB input signal timings which have been tested by Toshiba. These are timings checked on the RGB input terminals of projection unit. If signal supplied is not exactly the same as one of the followings but is simile to one, it may be accepted by adjustment of projection unit. When picture caused horizontal jitter or display position difference, adjust the projection unit with optional controller. However, when signal cable used or other factors have problems, timing may cause trouble and picture will not be stable. When signal is not stable, each function of projection unit will not be guaranteed for good picture display.



Mode	Input Resolution	A (Pixels)	B (Pixels)	C (Pixels)	D (Pixels)	E (Pixels)	fH (kHz)	fV (Hz)	Clock (MHz)	G (Lines)	H (Lines)	I (Lines)	J (Lines)	K (Lines)
NTSC 2							15.734	59.94	16.521					
PAL 2							15.625	50	16.406					
NEC24 k	640 x 400	85	640	59	64	848	24.820	55.900	21.053	25	400	11	8	440
TEXT70	640 x 350	48	640	14	96	800	31.469	70.087	25.175	60	350	38	2	449
TEXT70	640 x 400	48	640	14	96	800	31.469	70.087	25.175	35	400	13	2	449
TEXT70	720 x 350	54	720	18	108	900	31.469	70.087	28.322	60	350	38	2	449
TEXT70	720 x 400	54	720	18	108	900	31.469	70.087	28.322	35	400	13	2	449
TEXT85	640 x 350	96	640	32	64	832	37.861	85.080	31.500	60	350	32	3	445
TEXT85	640 x 400	96	640	32	64	832	37.861	85.039	35.500	41	400	1	3	445
TEXT85	720 x 400	108	720	36	72	936	37.927	85.039	35.500	42	400	1	3	446
VGA50	640 x 480	40	640	24	96	800	26.25 0	50.00	21.00	25	480	18	2	525
VGA60	640 x 480	40	640	24	96	800	31.469	59.94	25.175	25	480	18	2	525
VGA72	640 x 480	120	640	32	40	832	37.861	72.809	31.5	20	480	17	3	520
VGA75	640 x 480	120	640	16	64	840	37.5	75	31.5	16	480	1	3	500
VGA85	640 x 480	80	640	56	56	832	43.269	85.008	36	25	480	1	3	509
MAC13	640 x 480	96	640	64	64	864	35	66.667	30.24	39	480	3	3	525
SVGA50	800 x 600	88	800	40	128	1056	31.40	50.0	33.158	23	600	1	4	628
SVGA56	800 x 600	128	800	24	72	1024	35.156	56.25	36	22	600	1	2	625
SVGA60	800 x 600	88	800	40	128	1056	37.879	60.317	40	23	600	1	4	628
SVGA72	800 x 600	64	800	56	120	1040	48.079	72.188	50	23	600	37	6	666
SVGA75	800 x 600	160	800	16	80	1056	46.875	75	49.5	21	600	1	3	625
SVGA85	800 x 600	152	800	32	64	1048	53.674	85.061	56.25	27	600	1	3	631
MAC16	832 x 624	224	832	32	64	1152	49.725	74.55	57.283	39	624	1	3	667

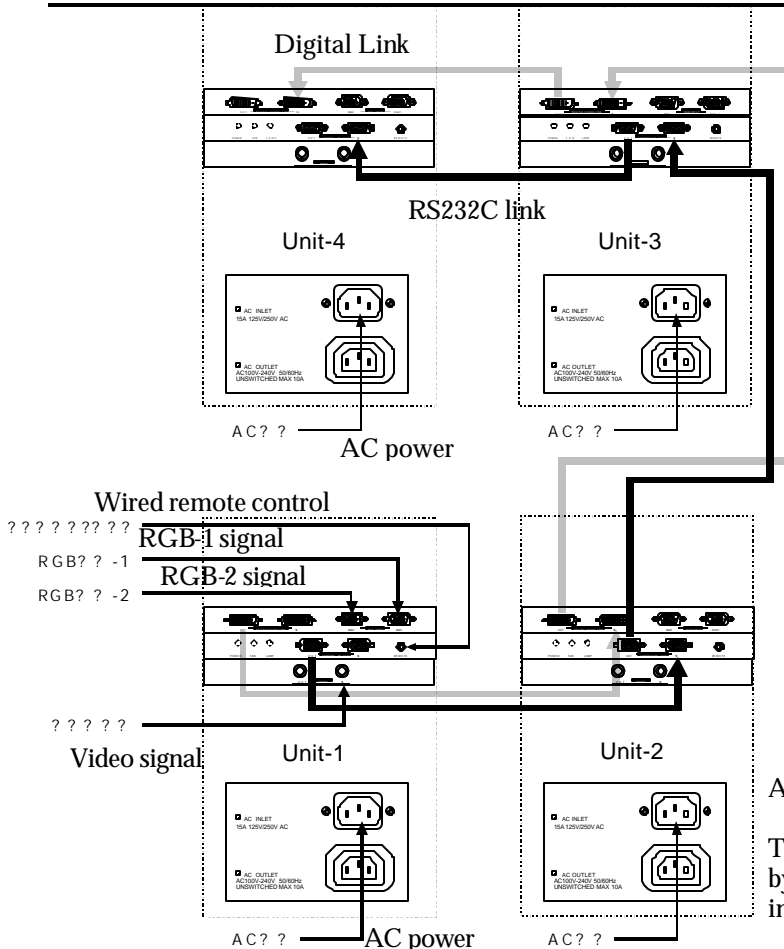
XGA50	1024 x 768	160	1024	24	136	1344	40.30	50.0	54.163	29	768	3	6	806
XGA60	1024 x 768	160	1024	24	136	1344	48.363	60.004	65	29	768	3	6	806
XGA70	1024 x 768	144	1024	24	136	1328	56.476	70.069	75	29	768	3	6	806
XGA75	1024 x 768	176	1024	16	96	1312	60.023	75.029	78.75	28	768	1	3	800
XGA85	1024 x 768	208	1024	48	96	1376	68.677	84.997	94.5	36	768	1	3	808
MAC19	1024 x 768	172	1024	34	96	1328	60.135	74.7	79.86	30	768	4	3	805
SXGA50	1280 x 1024	248	1280	48	112	1688	53.30	50.0	89.97	38	1024	1	3	1066
SXGA60	1280 x 1024	248	1280	48	112	1688	63.981	60.02	108	38	1024	1	3	1066
SXGA75	1280 x 1024	248	1280	16	144	1688	79.976	75.025	135	38	1024	1	3	1066
SEGA60	640 x 480	87	640	43	82	852	31.678	59.770	26.990	33	480	14	3	530
15.78	430 x 252	46	430	10	33	519	15.780	60.692	8.190	2	252	2	4	260
Tri-F60	640 x 480	116	640	38	64	858	31.469	59.941	27.000	30	480	9	6	525
480p	720 x 480	56	720	16	64	856	31.542	60.080	27.000	30	480	9	6	525
720p	1280 x 720	270	1024	260	96	1650	45.000	60.000	74.250	20	720	5	5	750
EDTV	720 x 480	59	720	16	63	858	31.469	59.941	27.000	33	480	6	6	525

Note 1: The clock pulse is made in projection unit automatically. External clock input is not equipped.

Note 2: When 15kHz NTSC/PAL signal is supplied to the RGB input terminal, the Digital Signal Link function is not guaranteed for correct signal transfer.

Note 3: When signal except standard type (for example, played back software with a copy guard or a special effect play of VCR, etc.) is supplied to the RGB input terminal, projection unit may not function properly.

## CONNECTION AT A MULTI PROJECTION SYSTEM



This is one of the example of connection for a multi-projection system using four projection units.

In this example, signal sources are supplied from composite video signal to video-card and signal from a PC is connected to each cubes by signal links.

The optional wired remote controller is connected to Unit-1 and all the units could be controlled by the remote control through System Bus-Link when RS232C communication links are daisy chain connected.

The final RS232C output should not return to 1<sup>st</sup> cube.

When both, RS232C control signal and CT-90000 wired remote control are connected, the remote control has a priority over PC, RS-232C connection thus PC control is not possible.

AC power source

This can be also possible to link up to 4 sets by separately purchasing 6ft monitor power interconnect cable

**MULTIPLE CONNECTION**



Note: Maximum length of the RS232C cable in total length is about 20-30 meters.  
 If the length becomes much more than its specification, the communication error may occur.  
 When some miss-reading of commands start to occur, then use better quality wire than its standard may reduce trouble and possible to extend the communication wire length.

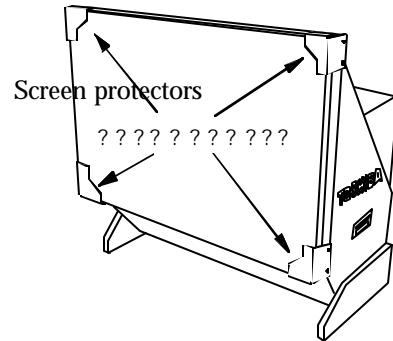
Using RS232C signal buffer distributor and separate the cable connection into two or more will also Reduce miss-communication troubles.

With this model DVI output is possible to form signal link connection by daisy-chain connection of DVI cables. When this feature is used, several frames of signal delay will occur by each cube's electronic circuit so that when moving picture is supplied, picture junction may not match.

When the set is opened from its carton box, 1<sup>st</sup> thing to do is to remove the screen protection metal plate attached at the corners.

- Note: \* Pay attention not to touch the screen.  
 \* When temporarily place the screen, avoid screen touching to the other objects or materials.

The screen is locked by small tab at sides and screw attached to the tab need to rotate to un-lock the screen frame.

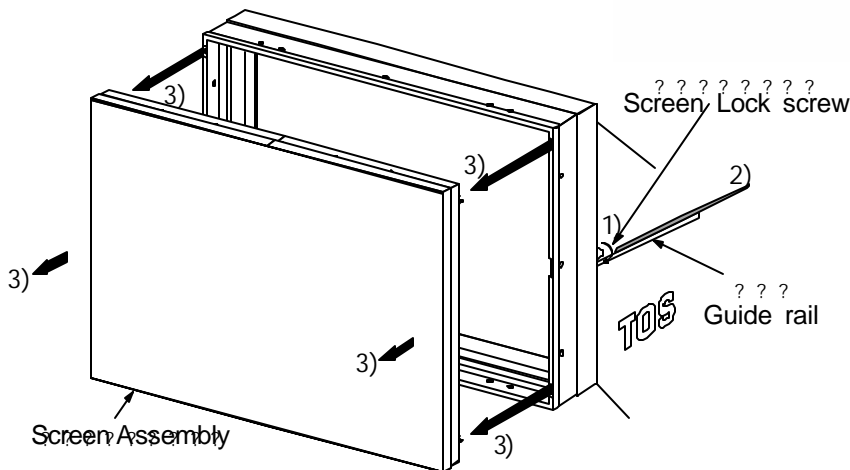
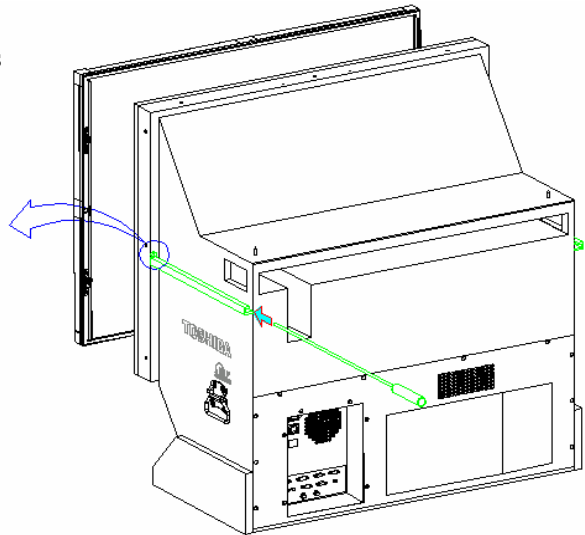
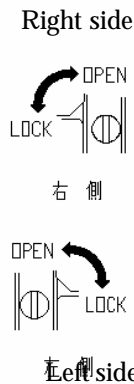


**Screen Lock screws**

The picture shows the screws which are vertical slit, this position make the screen lock released.

When this screw slit is rotated to 90-deg. horizontal, the screen frame is locked.

Another arrow with two points indicate the push rod position.



The screen can be removed by holding both sides of the frame and pull forward gently.

When wall assembled, then it is impossible to hold both sides of the frame thus, one person at front and another person at back and at back person needs to push the rod by long push pole. Any long push bar or pole can be used but strong, not easily bend pole is needed.

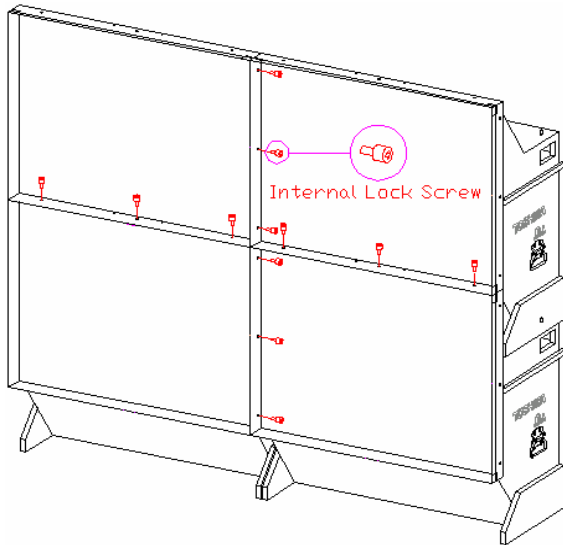
**MULTIPLE CONNECTION**

When attaching the screen, confirm the screen lock screw slit if it is placed vertical position so that the

screen lock is un-locked and open before attaching the screen.

This is an example of 4 sets attached together by 2x2 configuration. When 4 sets are combined together with the screws fastened, a gap between cubes becomes small and also stable for entire wall.

The internal locking screws need to be fastened while front screen has removed, carefully watching frame of each cubes. Do not tighten the screws very strong, aluminum frame may be deformed by such strong fastenings.

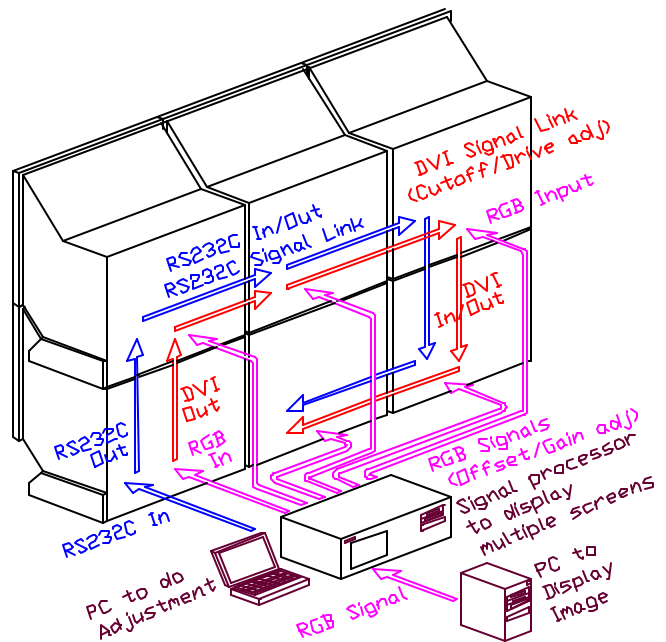
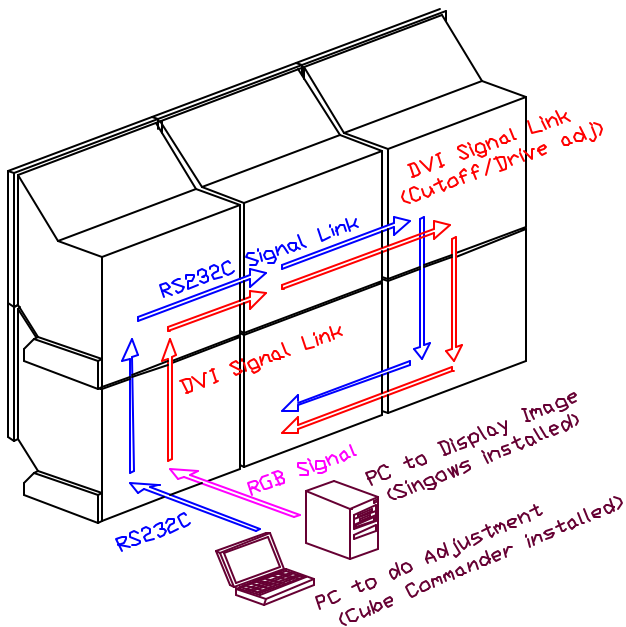


M8 screw 20mm long Hex key screw  
Tightening torque: 20-25N.m

At the back of the each cubes, there are two small plates located top portion at both sides and they can be used to fasten cubes horizontally or vertically for rear enforcement.

To do this, remove one of the screw, make loose for another and rotate the plate then fasten to adjacent cubes together.

As for the connection of wires, refer to the previous page, page 15 for one of the example. The following left example shows the connection to use internal magnification capability and right Example indicates the combination with external signal processor.

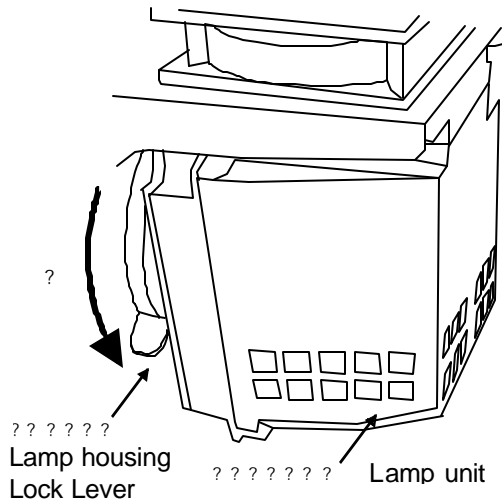
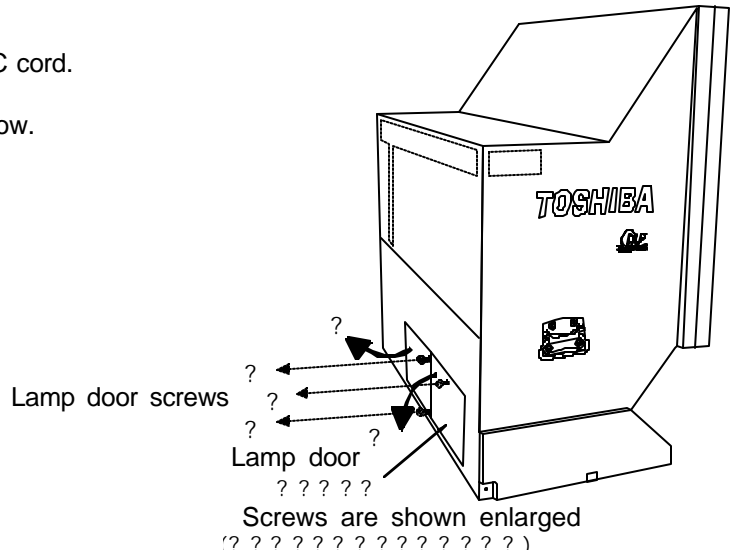


# DISASSEMBLE

## 1. HOW TO REPLACE THE LAMP

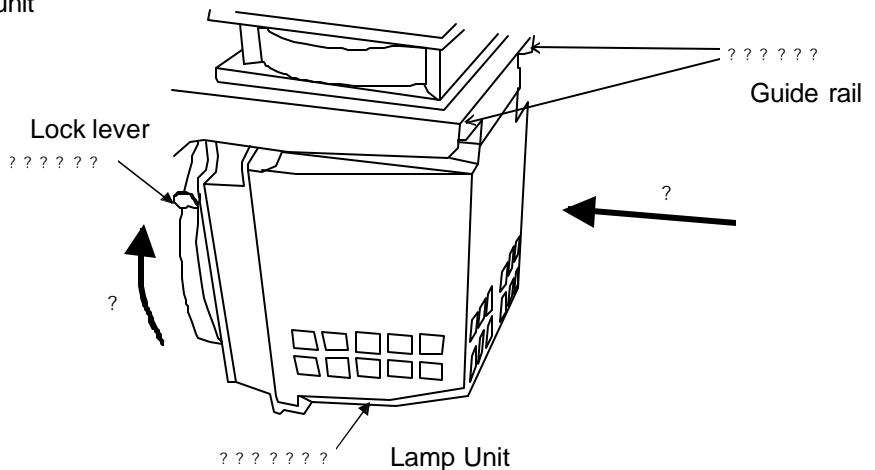
- 1) Turn off the power switch and disconnect AC cord.  
Make loose 3 screws at the lamp door.
- 2) Open Lamp door as right picture arrows show.

- 3) Rotate Locking Lever as shown as arrow (1) below.
- 4) Gently pull the lamp housing to the right as picture below, arrow (2) shows.



Note: Lamp housing and Lamp may be hot, be careful when touch to it.  
Do not touch lamp glass shield, an oil particle from finger may affect picture quality or lamp may be damaged.  
Wipe and clean lamp glass shield surface before its installation if it was not clean.

- 5) Attach new lamp at the guide rail shown as right then slide as arrow (1) shows. Lock lever needs to be at un-lock position, then push in the lamp holder at the right place. Lock the Lock ring by lock lever as arrow (2).



Note: When the lamp unit is not placed correctly, brightness or other picture performance may not be Achieved to the specification. Make sure that the lamp is nicely fit and fastened.  
Check also if the lamp power supply connector is securely inserted.

- 6) Attach lamp door.
- 7) Turn ON the power switch, connect PC with software, Cube commander, or remote control, then enter to the ADJUST mode → SPECIAL mode → F → STD thus the lamp timer is reset.

## 2 AIR FILTER

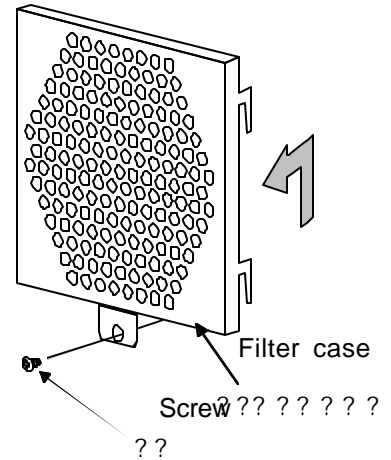
Air filter needs to be maintained periodically by washing it or replace when the filter is damaged.

- 1) Turn off the power switch and remove one screw.
- 2) Lift up and pull the air filter case from its pocket as arrow in the picture shows.
- 3) Wash and clean the filter and dry it.
3. Place the clean filter at its original place.
4. Fasten the screw.

Note:

This filter cleaning may be necessary to check and clean in every 3 months of period.

Continuous usage of clogged filter will affect to raise the internal temperature and may reduce the life of the components.

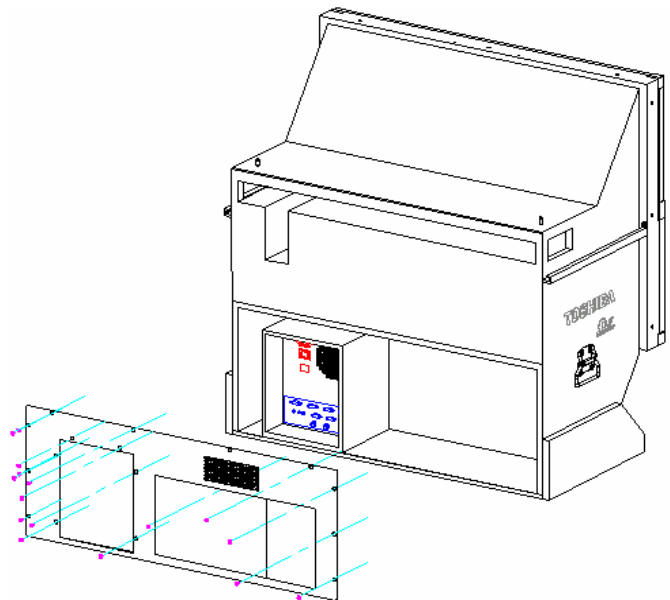


## 3. CABINET DISASSEMBLE

- 1) When mechanical position adjustments are needed, only the small door may be open to do. This is located at almost center position. Right side is lamp replacement door which has door switch to shut off lamp when opened.
- 2) When all the mechanism and electronics area to be shown, then, the rear panel needs to remove as right picture.
- 3) Location of the light engine or other parts, the next chapter explains them.

Front and rear portion are fastened with many screws to avoid electronic emission radiation.

Use all the parts and screws to assemble to have the same condition and reduce excessive emission from the electronics parts.



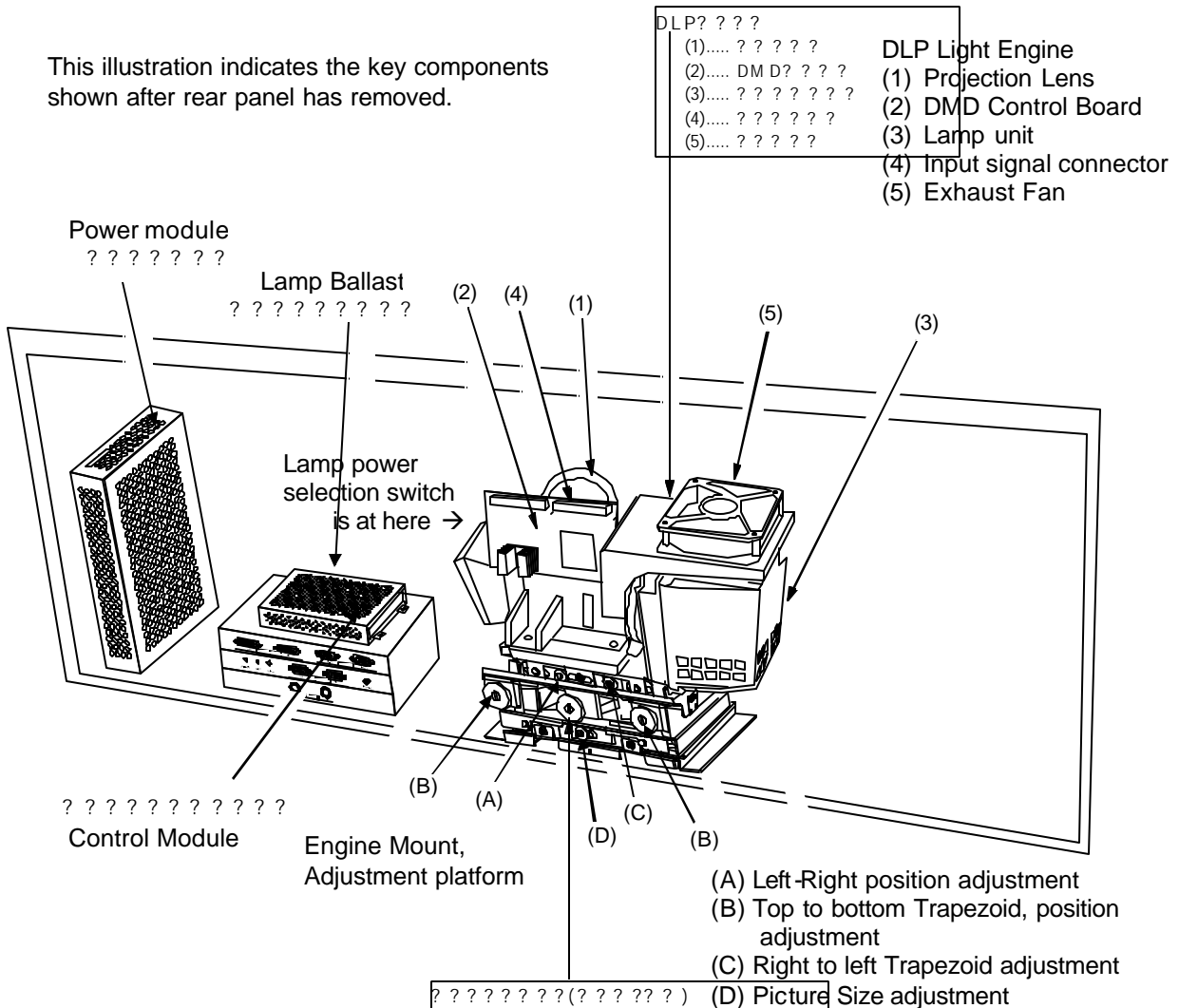
Refer to next page picture for following

When Lamp ballast needs to remove, take 3 screws out and pull it up. When I/O control box needs to be removed, after removing screws, pull forward a little, sometimes, it may be convenient to remove ballast unit before this.

DISASSEMBLE

#### 4. LOCATION OF KEY COMPONENTS AND FUNCTION MODULE

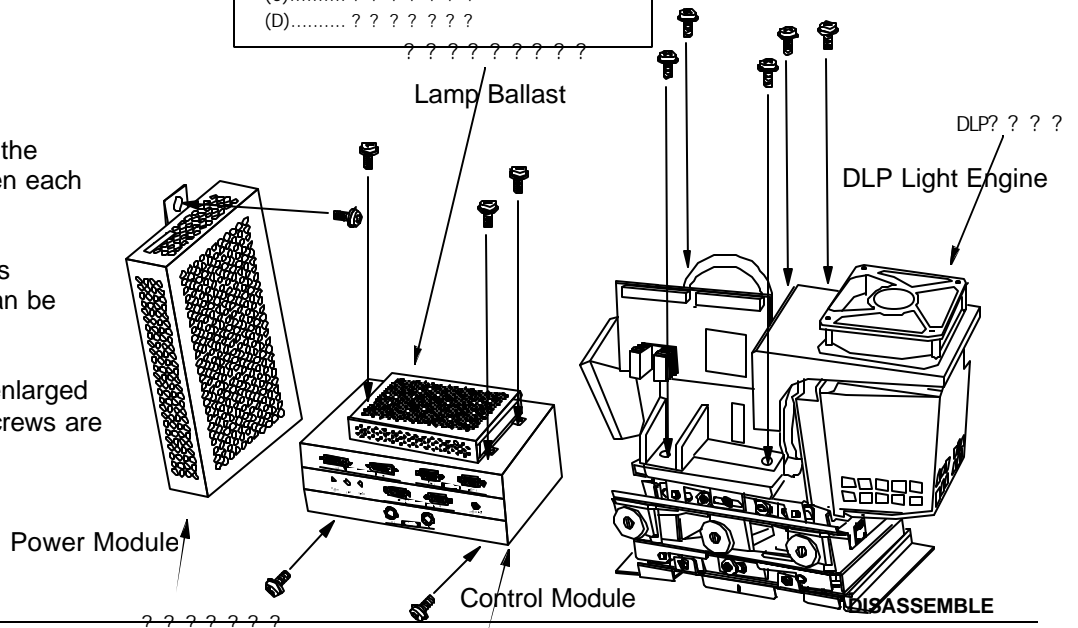
This illustration indicates the key components shown after rear panel has removed.



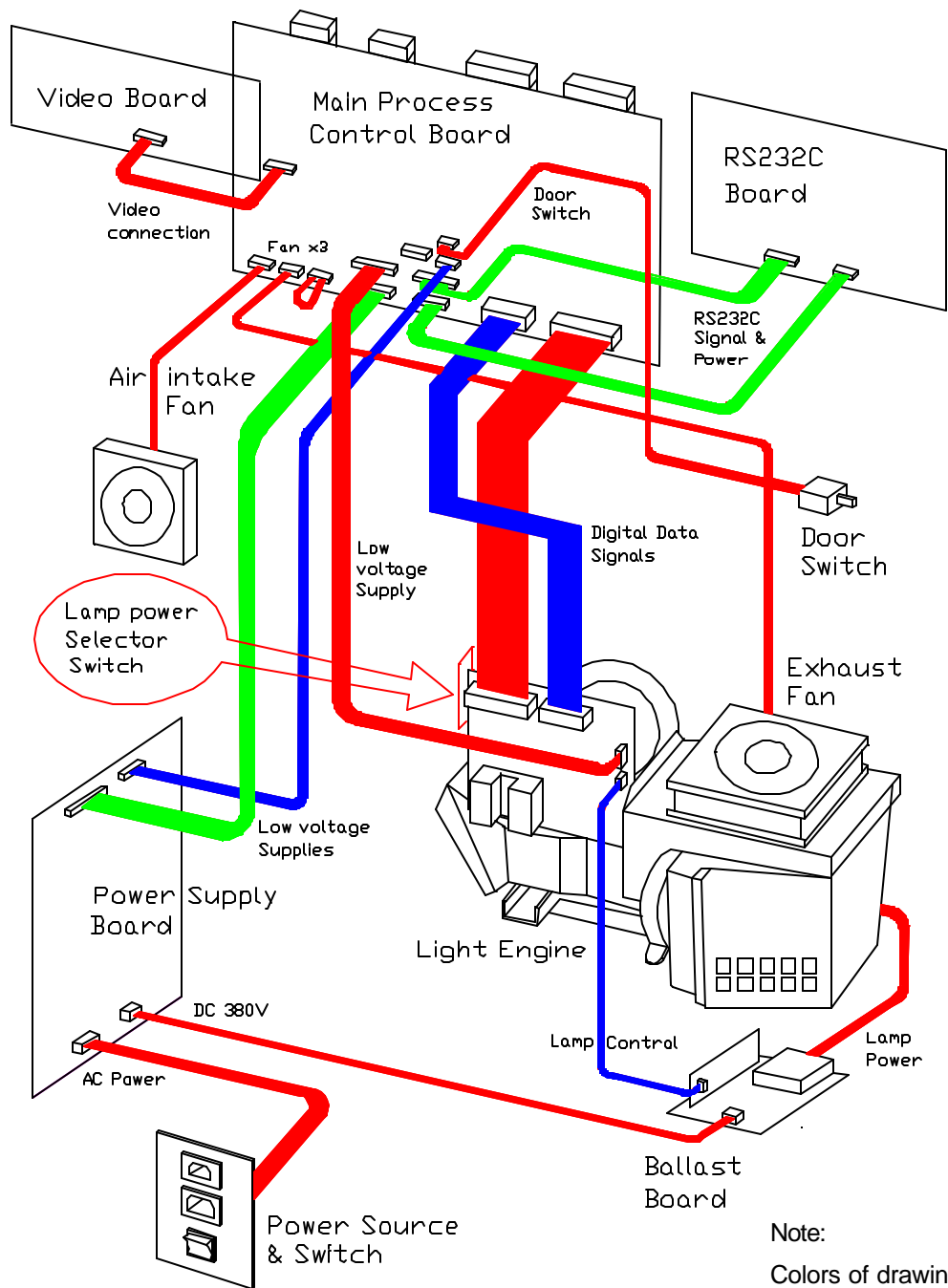
Right picture shows the screws used to fasten each blocks.

Removing the screws written, every unit can be removed.

This picture shows enlarged screw size, actual screws are much small.



## 5. WIRING BETWEEN FUNCTION BLOCKS



Note:  
Colors of drawing are not  
Representing the color of wires

**Note: 100W/120W lamp power selection \*\* selection of lamp power while lit will damage lamp\*\***

At the left side of the optical engine, there is a slide switch located and indicated that the lamp power switch is set to 100W position. Do not change the switch while powered. Turn off and select the switch.

## 6. LIGHT ENGINE BLOCK

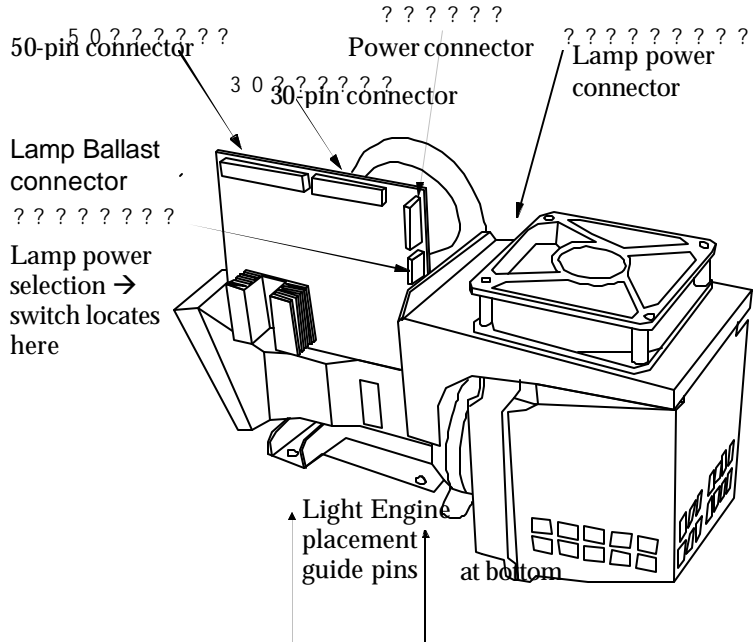
### ⚠ CAUTION

Be careful to prevent the ESD (Electro Static Discharge) before touching the DLP Engine. If ESD happened, important key components including DMD device may easily damaged. This electro-static destruction will not be covered by Texas Instruments guarantee.

For ESD prevention, use conductive wrist strap and connect the wire to the metal frame of the projection engine.

The light engine is Placed on the mechanical Adjustment platform.

When adjustments for picture position or distortion are necessary, electronics adjustments will not compensate the image. To perform, mechanism adjustments are necessary. The adjustment table (platform) needs to be adjusted at the right place but before doing this adjustment, it is important to set an electronic position adjustment should be at the center.



## ADJUSTMENT

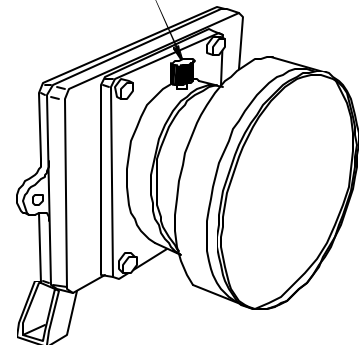
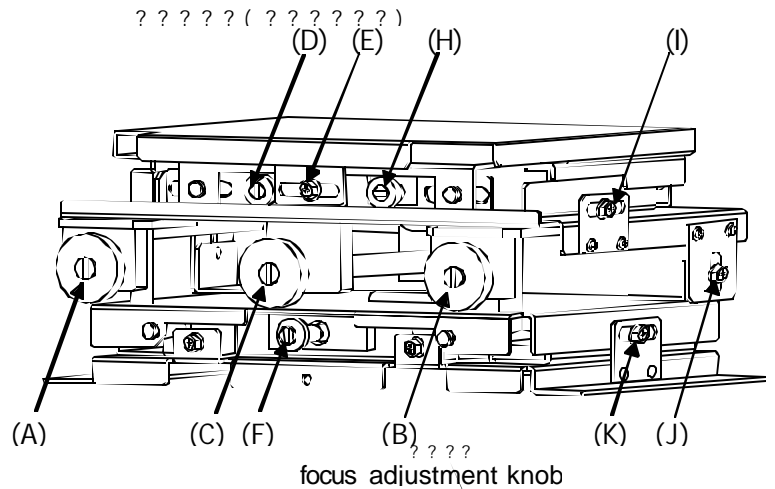
### 1. DLP Engine adjustment

When DLP Engine is replaced, most of occasion, following adjustments are needed.

New DLP engine may have some position displacement. The engine mount base has limited adjustment range but enable to cover most of position adjustment.

- 1) Loosen and release the screw tension which are used to fasten engine mount base (E) (I) (J) (K), to avoid any displacement during transportation.
- 2) Lens Focus Adjustment

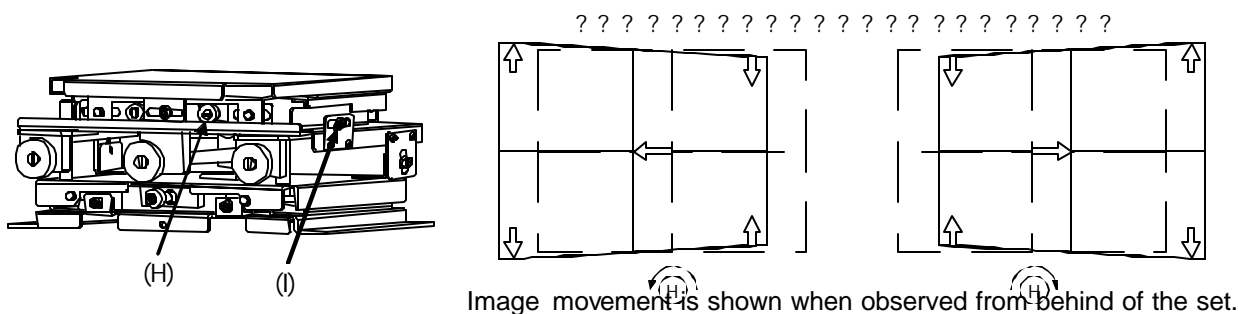
Before doing mechanical position adjustment, Check if optical focus is out or not. If the displayed picture, possibly using internal Test signal, cross-hatch, did not appear sharp, Then lens focus needs to re-touched



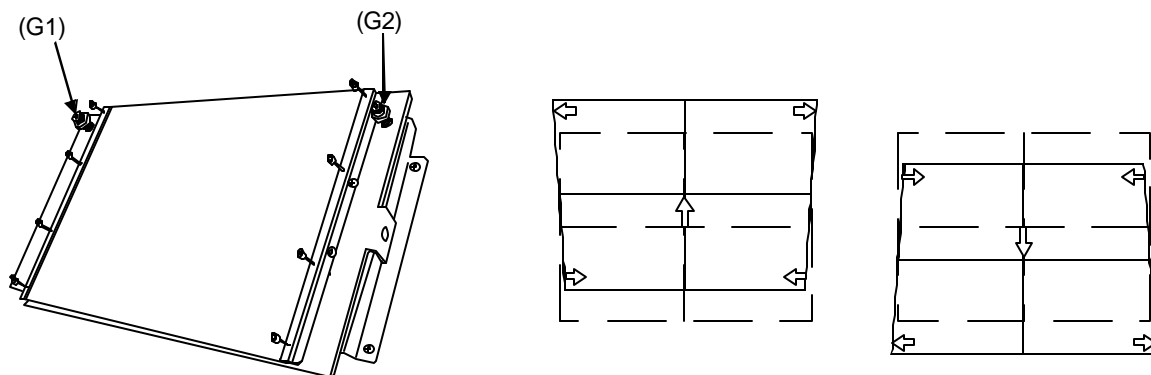
- (1) Locate the screw at the lens barrel to adjust focus
- (2) Rotate thumb screw to counter clockwise, then move the screw head to and fro to rotate so that lens focus can be adjusted.
- (3) Tighten the same screw to clockwise to fix the adjustment.
- (4) Engine mount adjustment preparation
- (5) Before doing Engine Mount mechanical adjustment, it is better to adjust an electronic position adjustment at the center.  
Use remote control or Cube adjustment software and enter Adjust mode, then perform H-V position adjustment, then place at the center of the range so that electronically, it is at the center.

**2. ENGINE MOUNT ADJUSTMENT**

- 1) Use internal test signal, TEST.P #07, thus full frame cross-hatch image appears on the screen
- 2) Left to Right Trapezoid adjustments can be performed by rotating (H) screw.  
By doing this Adjustment, horizontal position will move but disregard its movement of position. Obtain parallel image at top and bottom, then re-adjust position after this trapezoid adjustment. When top/bottom parallel adjustment is done, tighten (J) screw.



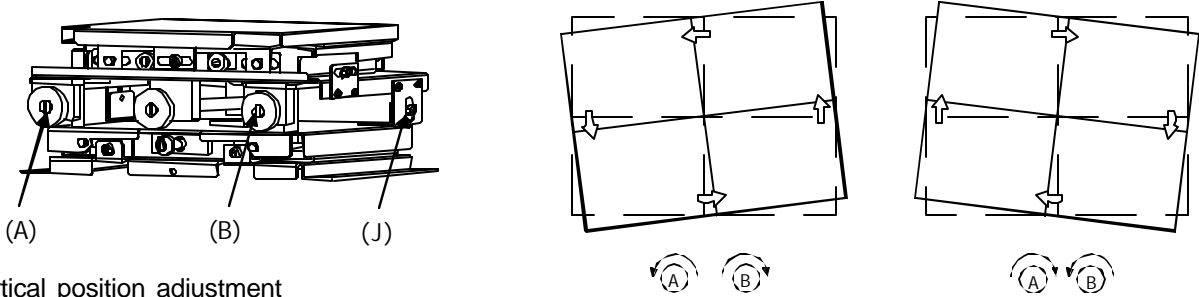
- 3) Top to Bottom Trapezoid can be compensated by the small mirror at (G1) (G2) screws.  
The picture is on the next page.  
There are total of 8 screws which are not so much touching to the mirror and these screws will add mirror bend thus the image distortion can be compensated but this top/bottom is basically done by these G1 and G2 screws. Adjust the image by rotating the screw so that left and right becomes parallel.  
By doing this adjustment, vertical position will change but do not worry about position displacement. Obtaining parallel at right/left is important, then adjust position.





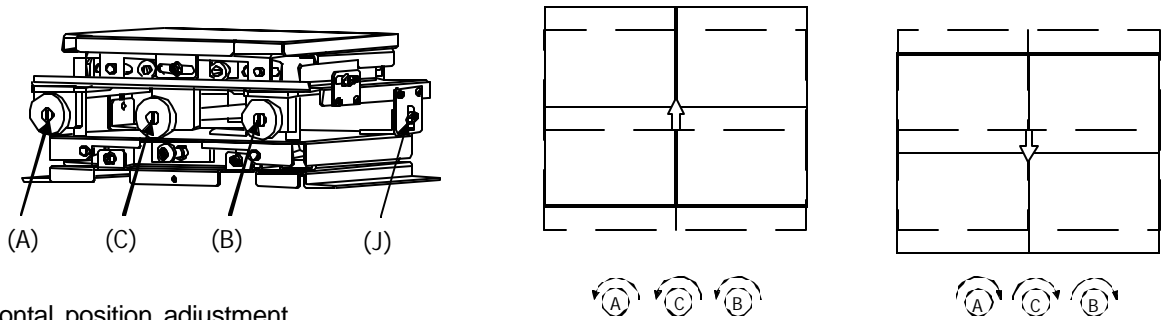
4) Picture rotation adjustment

Make loose of (J) screw and rotate the screw (A) and (B) to the same amount but the opposite direction so that picture rotation can be changed. If rotated to the same direction Vertical position will change. Tighten (J) after the adjustment.



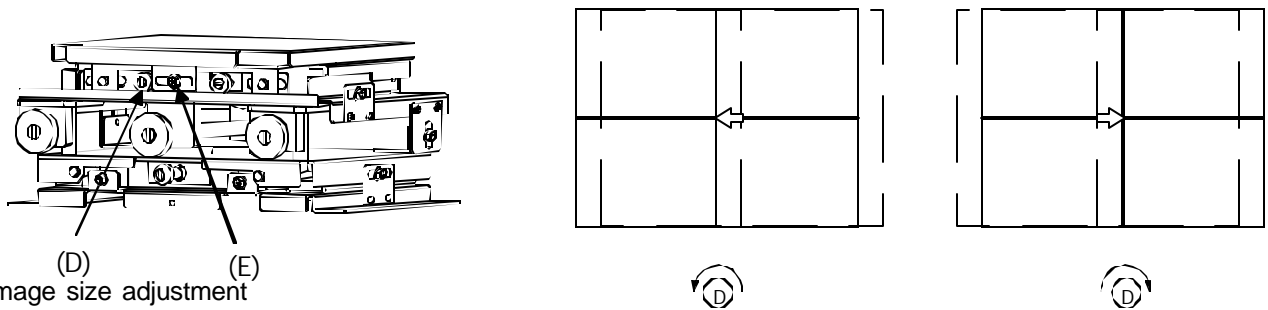
5) Vertical position adjustment

Make loose the (J) screw and rotate (A) (B) (C) screws for the same amount, vertical position adjustment could be done. Tighten (J) after the adjustment.



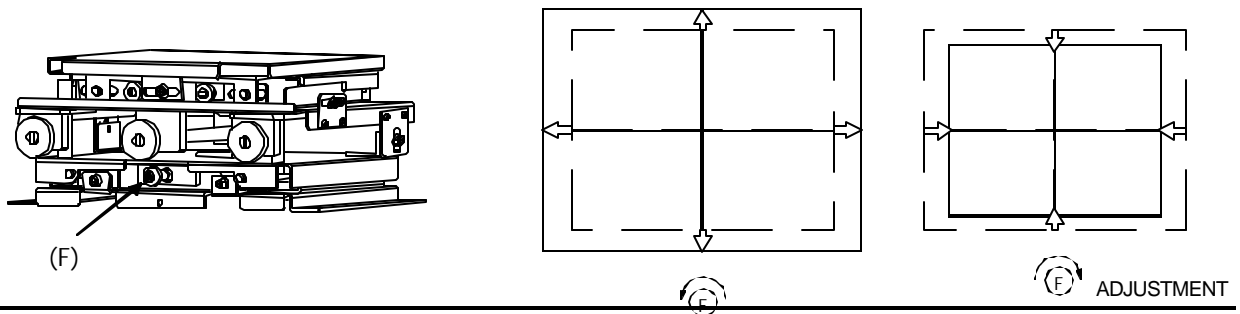
6) Horizontal position adjustment

Loosen screw (E) and adjust (D) screw for horizontal position. Tighten (E) after the adjustment.



7) Image size adjustment

Rotate (F) screw so that entire table will move to front or back. Placing the adjustment table far from the screen will make the picture size bigger and closer the table will result the size smaller. Adjust the size to the point that 2 pixels will be hidden by mullion. The outside line of the internal test signal will appear for 6 pixels thickness in the image. Do not adjust this if mechanism comes to an end, further adjustment will damage the mechanism.

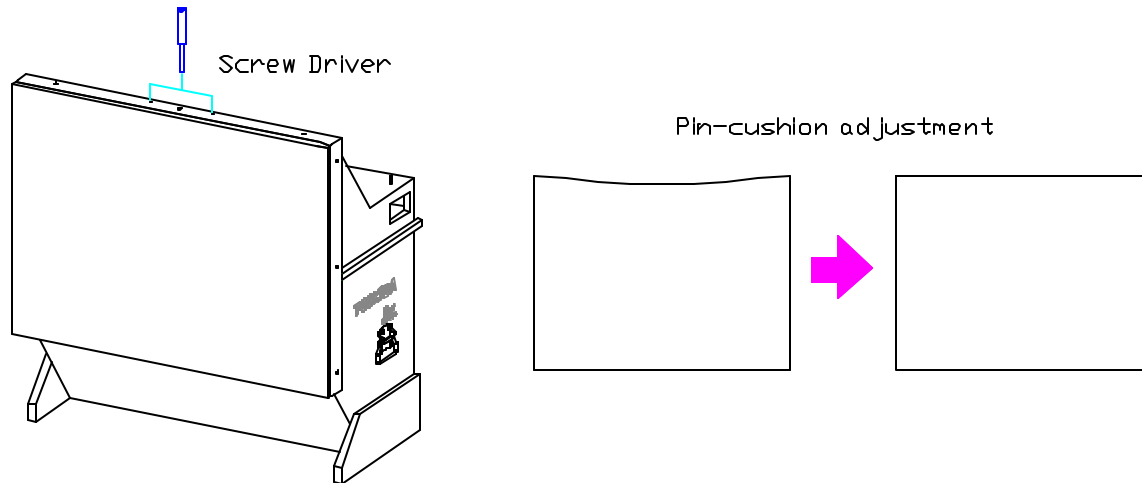


Above adjustments will do positioning and also sizing. The position could be compensated by the electronic adjustment but the size needs to be done mechanically. It is better to make mechanical adjustment as much as possible so that any different magnification, the image will appear right.

8) Upper portion Pin-cushion adjustment

This adjustment is to bent the mirror and make the adjustment, do not over do it.

This adjustment is easy to do while cube is not assembled to wall but even assembled, it is possible to perform removing the screen of the cube, attached on it.



**Important Notice:**

Do not exceed the adjustment too much, when mechanism comes to an end of its adjustment area, there is no stopper mechanism provided and further forcing to do so will make fatal damage to the mechanism.

These mechanical adjustments are important to display all the light coming out from engine to the full screen. If this mechanism adjustment is not good, picture may not appear in full screen however by electronic position and capture may possible to display.

Still, the 1<sup>st</sup> adjustment to obtain the full image is not an electronics but mechanism.

After performing all the mechanical adjustments, then electronic adjustment could be started.

Here is the summary of the adjustments.

1. Mechanical position adjustment by internal or external flat-field picture. Before this adjustment, it is better to reset all the electronic position adjustments at the center/reset value.
2. Electronic Picture Position adjustment by external signal, there may be a little differences between internal and external signal positions so that the signal which is generated from the PC which will be used, is the best to supply.
3. After the position adjustments, then, color balance adjustment would be performed. DMD drive condition can be changed by "Cutoff" and "Drive". These adjustments could be Done by internal test signal.

Then, "Offset" and "Gain" are provided to compensate the difference of signal level from PC.

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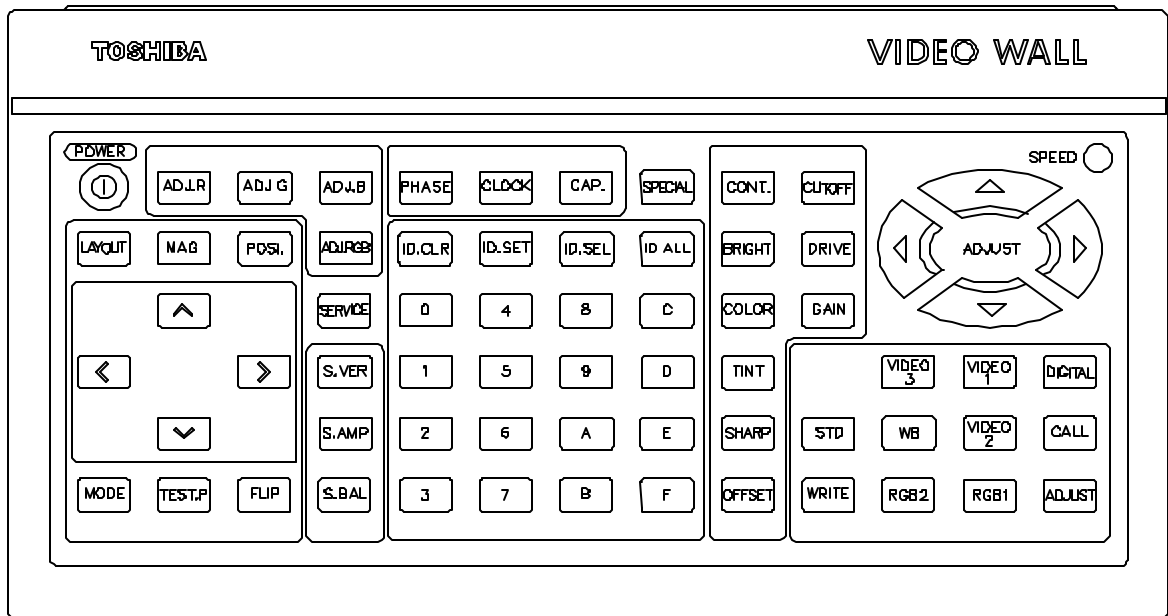
### 3. **Electronics Adjustment or Setting**

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Selection or adjustment can be performed using optional Remote Control, model CT -90000 or no Obligation, user-risk freeware, "Cube Commander".

Not all keys are used for adjustment.

Connect the remote control to the REMOTE jack (3.5mm stereo jack) on the projector.



This remote control is compatible for most of Toshiba data-wall display cube. The GUI of cube commander is also similar layout of the push buttons so that once the position of these key pads are getting familiar, both can be used without any difficulty. Difference between this remote control and software is, the ID number access, this is caused by the command generation CPU, in a PC which the software is installed or use the CPU in the cube.

<u>stand-by mode</u>	↔	<u>normal mode</u>	↔	<u>adjust mode</u>	↔	<u>special mode</u>
Power		Power		Cut-off		1: Auto-Adj on-off
		Digital		Drive		7: Picture in Picture
		Video1		Gain		8, A, B, C: OSD color
		RGB1		Off-set		9: Power Delay time
		RGB2		Contrast		D: Firmware Version
<u>ID mode</u>		White Balance		Brightness		E: Lamp Timer History
ID.ALL		Adjust		Color		F: Current Lamp timer
ID.SEL		Call		Tint		
ID.SET		STD		Sharpness		
ID.CLR		* MODE (0-9)		Phase	↔	<u>service mode</u>
Adjust		(Mag. Memory)		Clock		0:
				Capture		1: OSD Mute
				Magnification		2: Screen mode Lock
				Layout		4: Picture smoothing filter
				Position		C:
				Test pattern		
				Mode		
				Flip		
				Call		
				7: Color Mix (color coordinate) 4=R, 5=G, 6=B		

\* MODE button makes to recall Magnification memorized at 0-9 memory positions (ref P36)

This chart is indicating the functions and also which button can be selected.

ADJUSTMENT

### 3-1. Input Signal selection

Sources are selected by pressing the relevant source button: RGB1 RGB2 or VIDEO.

To select and display video picture, the video input adaptor need to be installed.

The screen will mute for approximately 5-7 seconds following source selection.

Source selection is basically possible in Normal Mode.

### 3-2. Adjust Mode

Press **ADJUST** to enter Adjust Mode.

To exit Adjust Mode press **ADJUST** twice (one press will request confirmation that you wish to exit Adjust Mode).

### 3-3. Saving adjustments

Adjusted value will be memorized into its non-volatile memory when **WRITE** button is clicked.

In case if the new adjustment value is not acceptable, simply shut off the power by rocker switch so that this new adjusted value will be erased and go back to “before adjustment” value.

### 3-4. Adjustment parameters

All parameters except ‘Layout’ can be adjusted using the **?** **?** **?** **?** buttons.

‘Layout’ position is adjusted using the **□** **□** **<** **>** buttons.

### 3-5. Internal Test Pattern

Test Patterns can be accessed by pressing **TEST.P** in Adjust Mode.

Continuously pressing **TEST.P** button will cycle through the available patterns or individual patterns can be selected by entering the relevant two digits number as **0** **7** **TEST.P** for direct number access for test signal #7.

### 3-6. White Balance adjustment

There are three independent memories for white balance adjustments, press WB in NORMAL mode to select the desired memory (WB1, WB2 or WB3) before making adjustments.

There are two stages for white balance or color balance adjustment to allow adjustment of low-signal-level and high-signal-level portions of the image.

For low-signal level adjustment, 10-20% IRE signal is required and this should be provided by the signal source to be used (i.e. if video is the source, a video test pattern generator should be used and if computer is the main source, test pattern generating software should be used).

**BRIGHTNESS** will control the overall brightness of the image and **CUTOFF** then followed by **ADJ.R**, **ADJ.G** and **ADJ.B** can be used to adjust the relative intensities of red, green and blue.

For high-signal level adjustment, around 70-80-90% IRE signal is required.

**CONTRAST** will control the overall level of the image and **DRIVE** followed by **ADJ.R**, **ADJ.G** and **ADJ.B** can be used to adjust the relative intensities of red, green and blue.

### 3-7. Gain and Offset

The previous adjustments as cutoff, drive, contrast or brightness act on the digital signal (after the A/D converter) and assume a signal level of 0.7V p-p was supplied.

It is also possible to adjust the analogue signal (before the A/D converter) but these adjustments should be kept to the default values in most cases of connecting one PC.

While DVI connection is used, this adjustment is not available.

---

## ADJUSTMENT

In case if the display is connected to multiple output card or such equipment having several individual outputs as video-wall processor, offset/gain adjustments will be the right an basic adjustment to compensate each signal level difference from each outputs.

**OFFSET** then following by **ADJ.R**, **ADJ.G** and **ADJ.B** can be used for the low-signal-level adjustment and **GAIN**, then **ADJ.R**, **ADJ.G** and **ADJ.B** for the high-level adjustment.

Adjustment hint: Cutoff and Drive adjustments can be done using internal test signal.

Display flat field test signal and press “cutoff” or “drive”, then adjustment is possible. In case of “offset” and “Gain” adjustments are placed at early signal process area and internal test signal is generated later stage than this adjustment, thus flat field test signal needs to generate from PC. Thus PC needs to have such signal generation software installed.

These color balance adjustments need to repeat several times from low signal level, Then perform high signal level, again, returning back to low, then high level signal. Repeat them several times to achieve better color balance.

**This is the general idea of adjustments:**

**DVI input:** only “Cutoff” and “Drive” by internal test signal or from PC

**RGB1 or RGB2, one PC:** “Cutoff” “Drive” by internal test signal or signal from PC and then, also “Offset” “Gain” by signal from PC for sub-adjustment

**RGB1 or RGB2 using video-wall processor:** “Cutoff” “Drive” by internal test signal and “Offset” “Gain” by the test signal comes from PC  
In this case, Offset and Gain adjustments are much more important to perform.

**Video input** “Cutoff” “Drive” by internal test signal and possibly “Brightness” and “Contrast” if needed by the signal from source

**3-8. Clock frequency adjustment and phase adjustment**

Supply fine pitch signal (such as Windows shut-down screen) and adjust **CLOCK** and **PHASE** to eliminate moiré and jitter.

**3-9. Image position adjustment**

Initial image position should be adjusted using the mechanical adjustments with internal test picture while electronic positions are at center so that all the unmagnified images appear at the same position. Use **POS** to electronically shift the image and **CAP** to select the position of the image for magnification.

**3-10. Screen Mode (frequency) Selection**

Incoming signals are automatically synchronized and the relevant timing data is stored in memory so that this data can be read out each time a particular source is recognized. RGB1 and RGB2 settings are memorized separately. There are total of 10 signal memory areas available, additional frequencies differ from VESA standard, they will be memorized for next time synchronization.

**3-11. On-Screen-Display, OSD**

The default condition is for the OSD to be on, this can be switched off by pressing the **CALL** button in Adjust Mode.

ADJUSTMENT

It is possible to change the color of the OSD:

**SPECIAL** **A** = red, **SPECIAL** **B** = green, **SPECIAL** **C** = blue, **SPECIAL** **8** = white.

**3-12. Video Enhancer**

When video input is selected, the following adjustments are available: **COLOR**, **TINT** (NTSC only) and **SHARP**

**3-13. Picture in Picture**

This is a feature which opens a small window and insert video image. The video signal input Terminal adaptor need to place. The PC image is the base and small window has video signal

Image, they cannot be changed. Get into Special mode by **SPECIAL** and **7** buttons will guide to this feature. PIP picture position can be changed by arrow keys.

### 3-14. Image Orientation

The image orientation can be flipped up, down, left and right using the **FLIP** key.

### 3-15. Status Indication

Pressing **CALL** in Normal Mode will display general information such as input selection and source frequency.

Pressing **SPECIAL** and then **D** in Adjust Mode will display software version and date.

**SPECIAL F** will display the lamp timer and **SPECIAL E** will display lamp history.

### 3-16. Factory reset STD key

This key need to be careful since all the adjustment data will be reset if pushed.

There is an on-screen-display indicating if this function would be performed or not.

Pressing this button again will erase all the adjustments and data are reset.

### 3-17. Color Mix adjustment (Color coordinate Control)

This is to compensate the color difference for example, when red picture is displayed on multiple screens and reds are different as pure red vs orange red. An ideal condition is to have all the same pure red all over the screens but in case if orange-red appeared at once cube, then other cube can be color compensated to add some greens so that other red can be matched to the orange-red so that all the colors can be matched same. Opposite operation, making orange to red is impossible.

Use **7** button while in Adjust mode, then click **4** for Red primary color and select **ADJ.G** for the color to be mixed in case of above situation. The primary color would be **5** for Green, **6** for Blue and **ADJ.R**, **ADJ.G** or **ADJ.B** will select the color to be mixed.

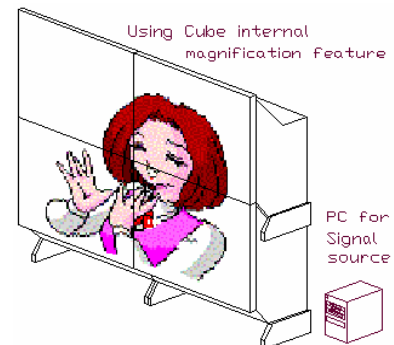
## 4. Multiple Screen Wall system (example)

The picture shows 2x2 wall by one PC displaying picture, using internal magnification capability.

To make this image by internal signal processor, MAG need to be set to 2x2 and left top cube need to have Layout of 1-1. The cube at right bottom needs to have Layout of 2-2. Small position adjustment may be needed to match the picture. When using internal magnification capability, still, all the cubes need to receive the same signal and DVI digital link will cover this part, using DVI cables.

When cube need to control or any adjustment needed, then each cube need to have its ID # different from the others so that the command can be sent to the right ID # cube.

This picture effect (ex. 2x2) can be memorized as User Magnification Pattern (p-36).



ADJUSTMENT

## 5. ID Assignment (example)

IDs should be assigned before connecting the RS232C control link cables and if ID has assigned already and want to change, it must be cleared at first before they can be re-assigned.

### 5-1. Clearing I.D.

Press **ADJUST** to enter Adjust Mode and then press **ID.ALL** to enter I.D. Mode, press **ID.SEL** 3 times and then press **ID.CLR** to erase the current I.D.

### 5-2. Setting I.D.

Press **ID.AL** so that 'INPUT ID NUMBER' appears and enter the desired 2 digits I.D. using the alpha-numeric keys. Press **ID.SEL** 3 times and then **ID.SET** to assign the I.D. – the OSD will disappear and the unit will return to Normal Mode.

### 5-3 Selecting I.D.

If using Cube Commander software simply select the two digits I.D. for the cube you wish to control. If using remote control it is necessary to press ID.SEL to access the correct menu for I.D. selection and control.

If **ID.ALL** is pressed instead of an alpha-numeric key 'X' will appear, pressing **ID.ALL** twice will display 'XX' (two wild cards) which will allow to control of all units simultaneously.

## 6. Magnification

To magnify the image, press **MAG** in Adjust Mode to change the magnification factor then type H+V magnification numbers as needed such as 1x1, 2x2... It is also possible to select the magnification factor for uneven magnification as 4x3 for example, horizontal of x4 and vertical of x3 magnification. To make this magnification effective, **MAG** needs to be clicked again.

Once the desired magnification has been selected press **LAYOUT** followed by **[ ] [ ] [ ] [ ]** to select the portion of the image to be displayed. If the picture will not match at the mullion area, then **POSI** will cover the adjustment. Then, to memorize this picture, press **WRITE** .

## 7. Function in Special mode

### 7-1. Auto-Adjust On-Off

This is to select if automatic centering function, of frequency converter, necessary or not. Auto center may have a chance to shift the image when power is completely down and on again.

### 7-2. Picture in Picture

By using **[7]** key after entering Special mode, Picture in Picture is possible. Always, the base picture is PC signal supplied to RGB input and small window picture is the signal supplied to Video input, composite signal.

### 7-3. OSD color

On screen display color can be changed by **[8]** : white, **[A]** : red, **[B]** : green or **[C]** : blue in Special mode.

### 7-4. Power On delay

By the setting of small power on timing to avoid the same time of lamp trigger, power supply can be set from 0-sec to 4.5-sec. This delay time is not accurate since the lamp may not ignite by the 1<sup>st</sup> trigger all the time. Entering SPECIAL mode, then click **[9]** makes to change the Delay time.

### 7-5. Firmware version

Using **[D]** button in Special mode, the system Firm-ware version could be displayed.

ADJUSTMENT

### 7-6. Lamp Timer History

By **[E]** button, Lamp usage timer history could be displayed.

### 7-7. Current Lamp Timer indication

This mode will display only one lamp display, the current lamp. When lamp timer needs to reset, Entering to this mode will conduct to the further operation.

### 7-8. Lamp Timer Reset

While in Special mode, **[F]** will indicate the current lamp timer and using **STD** button twice, then **WRITE** button, the current timer count will stop and starts from new counter reading.

## 8. Function in Service mode

### 8-1. OSD Mute

This is similar as like as **CALL** button clicked while in Adjust mode, OSD would be erased or displayed on the screen by **[1]** button while in Service mode. Even when OSD is erased, still the

function is continue to operate as in the same operation mode. One of the good way to use this operation is, in normal condition, OSD appears when Input is selected in Normal mode. Some user may not like this, then enter this mode or other method is, enter Adjust mode, then click **CALL** so that OSD will disappear even in the system is in Adjust mode. Then click **WRITE** button to memorize this function.

#### 8-2. Screen mode Lock

This could be used only when one designated PC used, so that the same PC picture will appear always correct but not for the other PC. Use **2** button while in Service mode

#### 8-3. Picture smoothing filter

This is applying smoothing filtering on picture, by using **4** button, selection can be done.

## Electronic Circuit Explanation

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### 1. Input/Output/Control PCB

RGB Input signals are switched inside of AD converter and then level controlled by Offset and Gain, in AD9888, then fed to AD converter section of the same IC.

VIDEO input is decoded by VPC3230D, auto -switching between PAL and NTSC, the output is supplied by 8:4:4, 16 bit digital YUV signal to PW166 frequency converter scaler (scale up/down).

DIGITAL signal is supplied to SII161, single link DVI receiver then fed to PW166.

Supplied signal to PW166 is changed to 1024x768, 60Hz and then be supplied to next stage.

Switched digital signal is supplied to SII160 to form DVI output.

The functions of PW166 scaler (scale up/down) IC are:

- Auto -detect RGB signal display timing
- Auto -adjust capture, position, signal clock and phase
- Auto -capture NTSC/PAL video signal
- Image scaling up/down (VGA, SVGA, XGA, SXGA to XGA , 60Hz)
- Frame rate conversion with frame buffer memory
- Video RGB color space conversion
- Test pattern OSD generation
- On-chip 16 bit MPU for software development
- DMD control signal Generation
- Digital 24-bit RGB, XGA outputs
- 

ELECTRIC CIRCUIT EXPLANATION

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Incoming signals are all converted to XVGA, 60Hz except PAL signal (50Hz).

Signal recognition and scaling is carried out using standard VESA signals, if a non-standard signal is supplied, the image may not be displayed correctly.

All incoming signals are converted to 60Hz and the color filter wheel rotation speed is 120Hz.

The output from the scaler is supplied to GmZ4S magnification IC and then, sent to DMD drive board.

### 2. DMD Driver PCB

The processed digital signal is sent from the RGB/Control PCB to the DMD Driver PCB via multiple pins connector (50-pin & 30-pin) together with all the necessary signal and also power supply.

The TI driver IC, DDP1000 controls the signal, supplies to the DMD through frame memory buffers, also color wheel motor signal is sent to M307982APZ.

The DMD element, TI Driver DDP1000 and DAD1000 form DDR chip set, a Texas Instruments products.

Signal send out timing from TI driver to DMD is programmed to suit Toshiba filter wheel which is based on good color reproduction even having white portion for so called "non-flicker" ignition.



The lamp used is UHP 100/120W, driven by the ballast, this lamp/ballast combination is made by Philips enables to select lamp power for 100W or 120W by mechanical slide switch. Do not replace the lamp with other model, a reflector which focuses the lamp beam is designed for DLP use, with light tunnel application. Different lamp may not have right specification or lamp life may be much different. The lamp for previous model, P500DL, is different from the P503DL lamp. To avoid such confusion, the lamp connector has different shape so that other lamp will not fit.

3. Power Supply PCB

The power supply consists of two sections, Power Factor Control and DC-DC conversion. Incoming AC is rectified and supplied to the PFC converter, where the voltage and current phases are matched, thus resulting power factor becomes 1. The output of the PFC circuit is 380V DC and this is supplied to the main DC-DC converters and also the Lamp Ballast. The outputs of the main DC-DC converter are +12V, +6V and +4.5V. Also, +12V which is connected to the fans and +5V for micro processor are separately prepared.

4. Lamp Ballast PCB

The Philips® 100/120W UHP lamp is driven by Philips ballast, power supply. The input voltage is 380V DC and high voltage trigger which is about 20kV pulse to ignite while lamp start period and lamp supply voltage is given to continue to its discharge by about AC50V, plus non-flicker pulse drive voltage is superimposed from lamp ballast output.

5. RS232C Control PCB

RS232C control signal or/and remote control from optional CT90000 are accepted, if both are connected CT90000 has priority over RS232C communication line. RS232C **parallel cables** need to use.

6. Video PCB (option)

Accepts PAL/NTSC/SECAM composite video signal and has a buffered output for loop-through. Normally in case of PC picture, DVI internal link would be used for not so much active movement pictures but in case of video picture, sometimes, DVI link may contain some picture frames of delay occurred by each cubes so that images of all the cubes may not match but later the connection, more movement delays may result. In such occasion, Video output to next video input, video loop through may results better picture by less delay composed.

**Appendix-1**

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**P503DL control board LED status**

	POWER	FAN	LAMP	Blink time	
POWER OFF	OFF	OFF	OFF		
STANBY	ON (red)	OFF	OFF		
Preparation	ON (green)	ON (green)	OFF		Before Lamp lights
POWER ON	ON (green)	ON (green)	ON (green)		After Lamp lights up
Normal	ON (green)	ON (green)	ON (green)		
FAN STOP	ON (green)	Blink (green)	OFF	0.2 SEC	Lamp will shutdown
LAMP cannot light	ON (green)	ON (green)	OFF		

LAMP Broken	ON (green)	ON (green)	Blink (green)	0.2 SEC	
Interlock	ON (green)	ON (green)	Blink (green)	0.5 SEC	
FAN NG	ON (green)	Blink (green)	OFF	0.2 SEC	Before light the Lamp
Normal	ON (green)	ON (green)	ON (green)		
Preparation	Blink (red)	ON (green)	OFF	0.5 SEC	Lamp shutdown
STAND-BY	ON (red)	OFF	OFF		STANBY

Note:

1. When power switch is turned ON, 2 LEDs, POWER and FAN will turn ON.
2. After lamp is safely turned on, then LAMP LED turns ON.
3. When display is turned off by remote control or operation software, this display will enter to STAND-BY mode, having all the power supplied to the circuit but for the lamp and motors and POWER LED turns ON by red color, no Fan/Lamp LEDs light.
4. When main locker power switch is shut off, all the power will be off (full reset).
5. When any Fan had a difficulty and stop rotation, FAN LED starts to blink.
6. When lamp has difficulty and did not turn on, LAMP LED blinks.

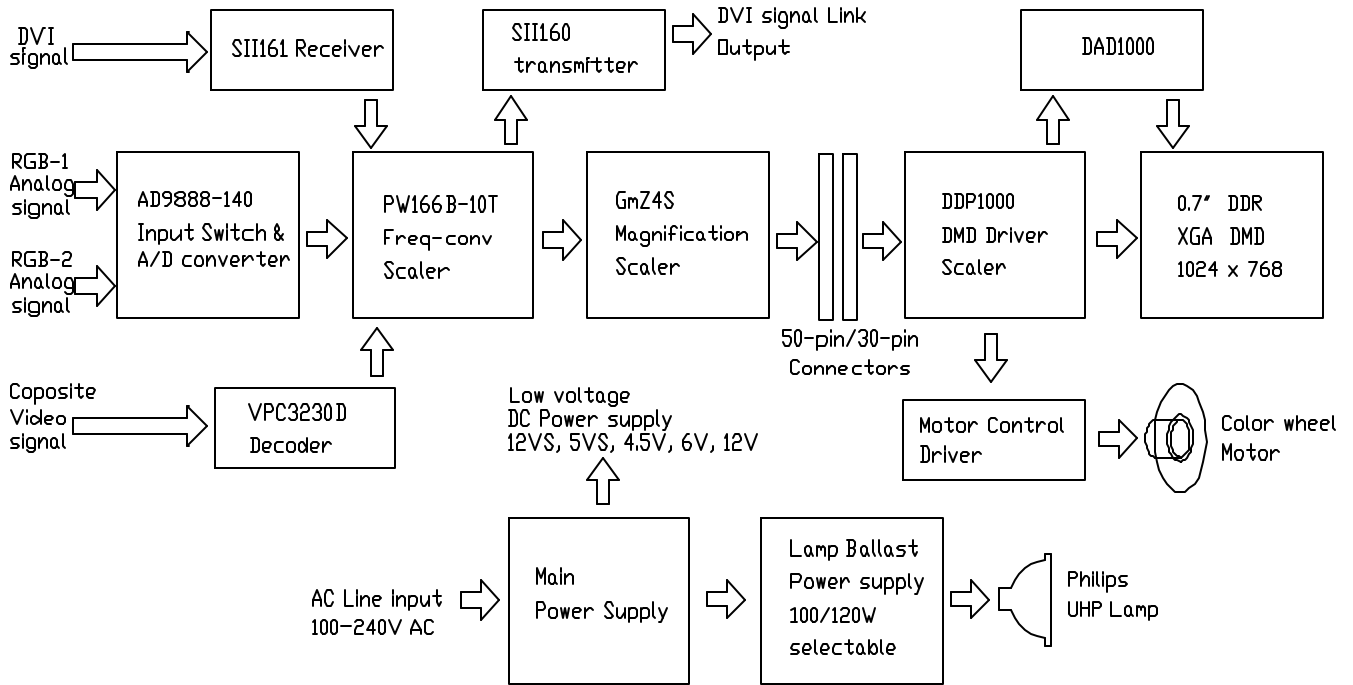
Once the display entered to STAND-BY mode, this can be confirmed by red POWER LED turns ON, in this condition, turning ON-OFF of main power will not restart the set.

This should be operated by the remote control or the software and hit POWER button on the remote control or software GUI after main locker switch is turned on and confirm that the red LED is lit, then click POWER button so that display will turn ON and power LED indicator changes to Green.

When main power is disconnected or power failure occurred during its operation, the equipment will turn ON when power is restored.

## Overall block diagram

Note: DVI signal Link output  
is converted to XGA/60 signal



Note:

1. RS232C is connected to PW166B Scaler
2. Lamp ballast is using reduced flicker ignition system, use specified lamp listed in the parts list

Note: When color balance adjustment is necessary, this is a small hint to perform.

1. Use internal test signal so that flat field is displayed to all the displays.
2. Offset/Gain cannot be performed since these adjustments are located before the test signal generator section.
3. Supply low signal level about 10 or 20% amplitude and adjust "CUTOFF" of each displays and obtain the same white balance.
4. Supply high level signal about 70-80-90% whichever suite to the occasion. Adjust "DRIVE" so that all the displays have the same white balance.
5. Repeat Cutoff/Drive adjustments several times since each adjustments affect each other.
6. When a magnification/picture-insertion signal processor is used, connect each output wire to each display.
7. Adjust "OFFSET/GAIN" so that all the colors/white balances are the same. This is to compensate the difference of output signal level of each input, do not touch or readjust Cutoff/Drive, these adjustments are done in previous stage.
8. When RGB signal distribution amplifier/buffer is used and each signals are connected to each displays, follow the same way to adjust the Cutoff and Drive by one signal source and compensate by Offset/Gain for each signal level differences.

**Control via RS-232C – Command Protocol list**

Table –1 RS-232C pin-connection configuration

Pin No	Signal name	Signal items	I/O (in projector)
1	CD	Not used	-
2	<b>RXD</b>	<b>Reception data</b>	<b>Output</b>
3	<b>TXD</b>	<b>Transmission data</b>	<b>Input</b>
4	DTR*	Data terminal ready	Input
5	<b>SG</b>	<b>Signal ground</b>	<b>Ground</b>
6	DSR*	Data set ready	Output
7	RTS**	Transmission request	Input
8	CTS**	Transmission enable	Output
9	CI	Not used	-

\* Shorted at projector inside \*\* Shorted at projector inside

Table –2 RS-232C Communication status

Status name	Status
Communication system	Transmission speed : 9600 bps Parity bit : NO, Data length : 8 bit, Stop bit : 1 bit
Communication type	1 Block consists of STX (1Byte) + IDT(2Byte) + CMD (3Byte) + ETX (1Byte). STX=02h, ETX=03h, IDT= Alphanumeric character (0-9, A-F, *)

2-2-3 Control Commands List:

Table : 1 Standby mode (Command to be used in standby mode )

Item	Contents	Key(CMD**)			
POWER	Turning power ON	PWR	PON		

PWR: Alternation switch command      PON: Direct switch command

Table : 2 Normal mode (Command to be used in normal mode )

Item	Contents	Key(CMD**)			
POWER	Switch projector on-off, Enter stand-by or escape	PWR	POF	PON	
CALL	Show status on the screen, on-off	DSP	DON	DOF	
RGB1	Selects RGB – 1 input source		IN1		
RGB2	Selects RGB – 2 input source		IN2		
DIGITAL	Selects DIGITAL Link input source		IN3		
VIDEO	Selects VIDEO input source		IN4		
W/B	Switch white balance mode (W/B 1.2.3)	WBL	WB1	WB2	WB3
ADJUST	Enters adjustment mode (ADJUST Mode)	AJS	AJY		
ID SET	Setting ID		IDS		
ID SEL	ID Selection		IDT		
Mute	Picture mute on-off	MSW	MON	MOF	
STD	Reset user setting to factory defaults		VST		
MODE+0	User magnification pattern 0		SM0		
MODE+1	User magnification pattern 1		SM1		
MODE+2	User magnification pattern 2		SM2		
MODE+3	User magnification pattern 3		SM3		
MODE+4	User magnification pattern 4		SM4		
MODE+5	User magnification pattern 5		SM5		
MODE+6	User magnification pattern 6		SM6		
MODE+7	User magnification pattern 7		SM7		
MODE+8	User magnification pattern 8		SM8		
MODE+9	User magnification pattern 9		SM9		
A + A	Show 10-User sets, can be assign to custom set		VNA		
B + B	Show custom settings, 9-sets		VNB		
Apply 1	Apply custom setting 1		CS1		
Apply 2	Apply custom setting 2		CS2		
Apply 3	Apply custom setting 3		CS3		

Apply 4	Apply custom setting 4		CS4		
Apply 5	Apply custom setting 5		CS5		
Apply 6	Apply custom setting 6		CS6		
Apply 7	Apply custom setting 7		CS7		
Apply 8	Apply custom setting 8		CS8		
Apply 9	Apply custom setting 9		CS9		

Table : 3 ADJUST MODE (Command to be used in ADJUST MODE)









Item	Contents	Key(CMD**)			
CONT.	Selects contrast adjustment ( ADC RGB gains )		CNT		
BRIGHT	Selects brightness adjustment ( ADC RGB offset)		BRT		
COLOR	Selects color adjustment ( Video decoder )		COL		
TINT	Selects tint adjustment ( Video decoder )		TNT		
SHARP	Selects picture sharpness adjustment ( video decoder)		SHP		
CUTOFF	Selects DLP low level adjustment (white balance Dark)		LOW		
DRIVE	Selects DLP contrast adjustment (white balance High)		HIG		
GAIN	Selects gain adjustment ( RGB separate Gain )		GAN		
OFFSET	Selects offset adjustment ( RGB separate Offset )		OFS		
FLIP	Switch image direction (1.2.3.4)		FLP		
POSI.	Selects display position pixel base adjustment		POS		
CLOCK	Selects sampling clock frequency adjustment		CLK		
PHASE	Selects sampling clock phase adjustment		PHS		
CAP.	Selects caption position adjustment mode		C AP		
MAG.	Switches screen magnification (1x1 - 6x6 )		MAG		
LAYOUT	Selects screen layoutselection mode		LAY		
TEST.P	Selects internal test pattern		TSP		
ADJ.R	Selects adjustment color Red		SLR		
ADJ.G	Selects adjustment color Green		SLG		
ADJ.B	Selects adjustment color Blue		SLB		
ADJ.RGB	Selects adjustment color Red +Green + Blue		SLA		
	Adjusts movement to up or data value increase		VUP		
	Adjusts movement to down or data value decrease		VDW		
	Adjusts movement to left		VLF		
	Adjusts movement to right		VRG		
	Change layer upward (uses in LAYOUT mode) or test pattern number decrease (uses in TEST. mode)		DUP		
	Change layer downward (uses in LAYOUT mode) or test pattern number increase (uses in TEST. mode)		DDW		
	Changes layout leftward (uses in LAYOUT selection mode )		DLF		
	Changes layout rightward (uses in LAYOUT selection mode )		DRG		
CALL	On screen display status or menu on or off	DSP	DOD	DOF	
WRITE	Memorizing adjusted data		VWR		
SERVICE	Entering SERVICE MODE		SVC		
SPECIAL	Entering SPECIAL MODE		SPC		
ID.ALL	Entering ID MODE		IDA		
ADJUST	Exits ADJUST MODE (return to normal mode )	AJS		AJN	
MODE	Enable INPUT SOURCE SWITCH in ADJUST mode		MOD		
AutoAdjust	Execute Auto-adjust at frequency converter		AUT		
SPEED	Select Baud Rate		SPD		
0	Input 0		VN0		
1	Input 1 or Flip 01		VN1		
2	Input 2 or Flip 02		VN2		
3	Input 3 or Flip 03		VN3		
4	Input 4 or Flip 04 or Color mix Primary Red		VN4		
5	Input 5 or Color mix Primary Green		VN5		
6	Input 6 or Color mix Primary Blue		VN6		
7	Input 7 or Color mix on-off		VN7		
8	Input 8		VN8		
9	Input 9		VN9		

Table 4 : SERVICE MODE (Command to be in SERVICE MODE )

Item	Contents	Key(CMD**)			
0	User picture effect Memory User Memory read out				
0 + 1-9	Show or update Mag pattern 1-9		VN0		
1	Switches OSD mute on or off		VN1		
2	Screen Mode Lock Switching force timing 0: no force timing A: force timing A B: force timing B C: force timing C D: force timing D E: force timing E		VN2		
3	Freeze on or off		VN3		
4	Interpolation Filter selection A-B-C-D-E		VN4		
5	Aspect ratio switch 4:3 or 16:9		VN5		
WRITE	Memories adjusted data		VWR		
CALL	ON screen menu on or off	DSP	DON	DOF	
ADJUST	Exits SERVICE MODE (return to ADJUST MODE )	AJS	AJY		

Table 5 : SPECIAL MODE (Command to be used in SPECIAL MODE )

Item	Contents	Key(CMD**)			
1	Auto -adjust, on-off	R A1	VN1		
2	Last timing forced lock, on-off	R A2	VN2		
3	Frame lock on-off at SEGA60/Tri-F60 or V.S.X@60Hz	R A3	VN3		
4	Firmware version indication	R A4	VN4		
6	EEPROM reset time indication	R A6	VN6		
7	PIP on-off	R A7	VN7		
8	OSD color change to white( default )	R A8	VN8		
9	Set power on delay from 0 to 4.0 seconds	R A9	VN9		
A	Change OSD color to red	RAA	VNA		
B	Change OSD color to green	R AB	VNB		
C	Change OSD color to blue	R AC	VNC		
D	Display Software Version	R AD	VND		
E	Display elapse time and lamp replacement history	R AE	VNE		
F	Display lamp timer	RAF	VNF		
STD	Resetting present lamp timer (uses after F, then Write)		VST		
WRITE	Memorizes adjusted data		VWR		
CALL	Onscreen display on or off	DSP	DON	DOF	
ADJUST	Exits SPECIAL MODE (return to ADJUST MODE )	AJS	AJY		

Table 6 : ID MODE (Command to be used in ID MODE )

Item	Contents	Key(CMD**)			
ID.CLR	Clearing ID		IDC		
ID.SET	Setting ID		IDS		
ID.ALL	Input *		IDA		
0	Input 0		VN0		
1	Input 1		VN1		
2	Input 2		VN2		
3	Input 3		VN3		
4	Input 4		VN4		
5	Input 5		VN5		
6	Input 6		VN6		
7	Input 7		VN7		
8	Input 8		VN8		
9	Input 9		VN9		
A	Input A		VNA		
B	Input B		VNB		
C	Input C		VNC		
D	Input D		VND		

E	Input E		VNE		
F	Input F		VNF		
ADJUST	Exits ID MODE (return to ADJUST MODE )	AJS	AJY		
ID.SEL	Select ID		IDT		

## Appendix-3

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### Trouble shooting hints

#### 1. When lamp does not light

- a. Lamp will turn on but shut-off by itself within a short period of time  
This is one of the symptom when the lamp becomes to its life end. Intensity becomes low, lamp gap becomes wide, thus ballast power supply voltage becomes not enough to sustain the charge. the lamp needs to replace.
- b. Lamp bursts  
This is another phenomenon when lamp comes to its life end. The internal pressure becomes high and lamp breaks, lamp will not turn on, this is clearly the end of lamp life.
- c. Lamp will not turn on  
This is also another style of its end of life. When the gap between electrodes became wide, even high voltage ignition will not start the lamp discharge. This is another possibility. In this case, if carefully observed, lamp ballast will make noise while start ignition trigger is supplied, if this sound can be hear, then ballast is most possibly OK and lamp is wrong.

#### 2. When lamp does not turn on

- a. There are several possibility even the lamp is new. When one of the Fan stop its rotation, the motor sensor stop sending signal and CPU will turn of the lamp power to avoid heat going up by no airflow inside.
- b. When Color wheel motor is stopped, then motor rotation signal becomes missing, then this change also sends to stop lamp power.
- c. Lamp door open, this condition also shut off the lamp power.

#### 3. When color becomes strange

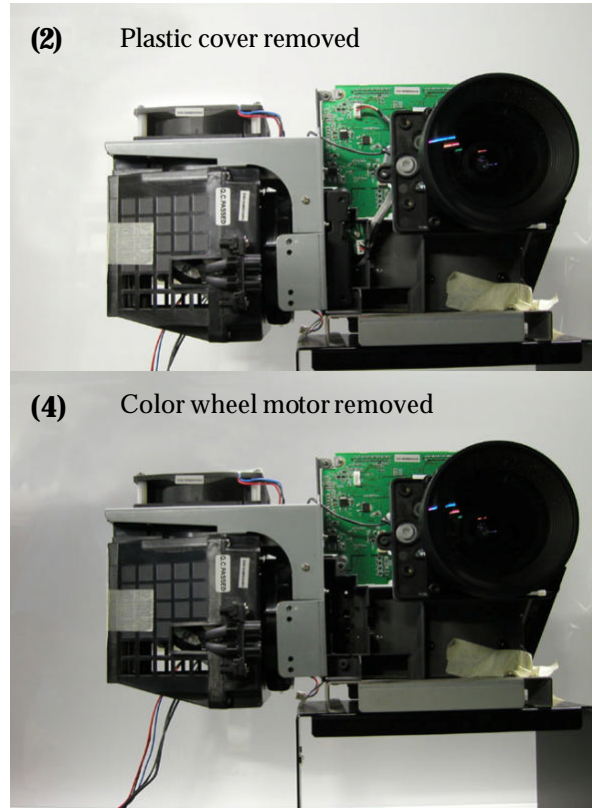
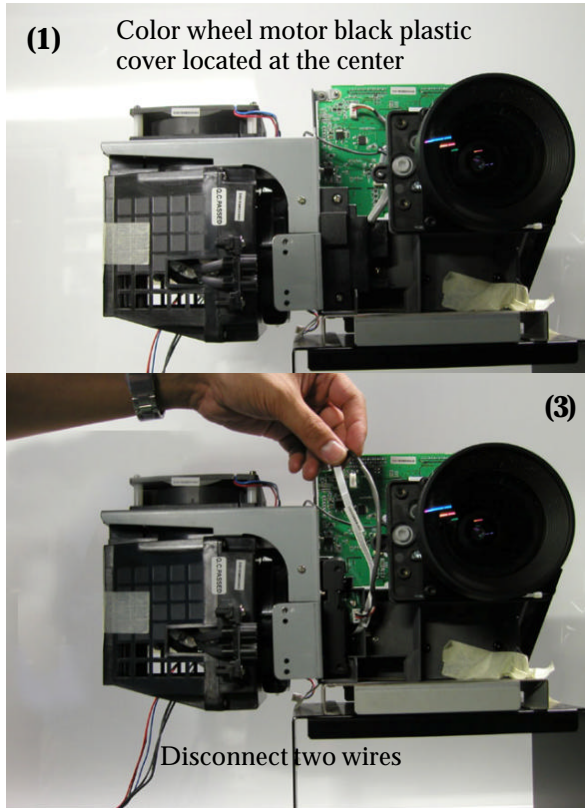
- a. Electronic circuit break down will lead for such color difference, key components are DMD drive board and I/O control board. 1<sup>st</sup> trial may be exchange the Control board to try out.
- b. At the time when color wheel motor may not synchronize to the incoming signal, there is a possibility to have different color or color flicker happens. If motor makes noise, then this is most possibly motor bearing needs oil. If motor becomes difficult to have smooth rotation, the color changes sometimes and comes back, then repeat this color change. The motor replace needed most possibly.

#### 4. When picture is strange and totally distorted

- a. There may be a possibility that some strong noise entered and micro-processor jammed. One of the easiest way is to shut off rear rocker power switch and wait for some period of time as one minute, then turn it on. By waiting such time, micro-processor will totally reset and possibly restart without any difficulty. This is caused by CPU jam by noise.
- b. When some difficulty happened on reset or original program start at DMD drive circuit, the picture may not be right or also I/O control board. Try replacing these boards one by one.

## 5. When color wheel motor needs to replace

- a. When color becomes different or will not synchronize, color wheel motor may oil or replace.
- b. It may be better to remove optical engine. Then follow as below pictures show.



- c. When mounting the color wheel motor, take care not to touch the round glass color filter which has sharp edge, there may be a risk of hand/finger hurt. Also oil from finger attached on the filter may be burn during operation by lamp heat and color or brightness may not right or possible damage of filter.

Note: When Lamp door switch is tripped, power supply will shut off and lamp turns off, this is not a trouble, this is normal operation. Before replacing the lamp, it is recommended to turn off the rocker switch and shut off power. The door switch is provided to prevent accidental touch while lamp is ON. Still, the lamp may be hot after door switch activated, it is better to turn off the main power switch and wait for some period of time as several minutes until lamp becomes safe temperature.



## PARTS LIST

Location No	P/N	Description
A101	23429090	CABINET, P503DL CABINET K
		L-Mirror Assy
		S-Mirror Assy
	70381150	Mirror P500DL(S)
	23528376	Holder-Latch C3-803
		Back-Panel Tilt
		Back-Panel Lamp
A102		SCREEN ASSY P503DL
A021	23890089	ADJUSTER, TILT TABLE
A701	23067691	CARTON, CASE
A702	23946322	PACKING, PACKING MATERIALS 1-SET
A703	23941621	PROTECTION SHEET
A704	23943008A	POLYETHYLENE BAG
A710	23918056	DY PACKING CASE STOPPER
A711	23974996	POLY PROPYLENE BAND
Y101	23552164	OWNER'S MANUAL, P503DL
Y102	23771092	ACCESSORIES, SCREWS
		AIR Filter (P503DL)
Cable	94800815	DVI Int erconnect Cable
	94800803	RS232C Cable
Component	94800804	DC Fan Assy AFB0912H-R00
	94800463	AC Power Cord 120V (USA)
	94800xxx	AC Power Cord 240V (UK)
	94800464	DDR-Wire 50-pin
	94800465	DDR-Wire 30-pin
	94800434	Ballast Module BT120DR
	94800460	DMD Chip Module DDR-DMD 0.7
	94800456	LP100DR Lamp with housing 100W pulse
	94800461	DDR Light-Tunnel Rod
	94800458	Color wheel Assy DDR-color wheel
Circuit Board	94800806	Power supply Module Assy
	94800462	PCBA DDR Control Board Assy
	94800459	PCBA DDR Driver Board Assy
	95800814	PCBA Video I/O Board
	94800811	PCBA RS232C Board Assy
Other		CT-90000 Wired Remote Control